DOCUMENT RESUME

ED 409 020 IR 056 412

AUTHOR	Wyman, Steven K.; And Others
TITLE	User and System-Based Quality Criteria for Evaluating Information Resources and Services Available from Federal Websites: Final Report.
SPONS AGENCY	OCLC Online Computer Library Center, Inc., Dublin, OH.
PUB DATE	Jun 97
NOTE	149p.
CONTRACT	35378874
PUB TYPE	Guides - Non-Classroom (055) -- Reports - Research (143)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	*Access to Information; Computer Mediated Communication; Design Preferences; *Evaluation Criteria; Evaluation Methods; Evaluation Needs; *Federal Government; Hypermedia; *Information Dissemination; Information Management; Information Needs; *Information Policy; Information Seeking; Information Utilization; Multimedia Materials; Online Searching; Online Systems; Reference Services; Standards; Users (Information); *World Wide Web
IDENTIFIERS	Federal Standards; Information Selection; *Web Sites

ABSTRACT

This exploratory study establishes analytical tools (based on both technical criteria and user feedback) by which federal Web site administrators may assess the quality of their websites. The study combined qualitative and quantitative data collection techniques to achieve the following objectives: (1) identify and define key issues regarding representation and access to information resources through federal resources; (2) identify and analyze key information policy issues related to the design, development, and management of Web-based information resources and services; (3) establish evaluative criteria for reviewing federal websites; (4) evaluate a sample of federal Web sites; (5) suggest analytical tools with which federal Web site administrators can analyze site structure and use; and (6) offer recommendations to increase the usefulness of federal Web sites to libraries and other users. Appendices are organized by the four different types of assessment used in the study: systems-based, user-based, design-based, and developer-based assessment (site visit). (Contains 54 references.) (SWC)

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User and System-Based Quality Criteria for Evaluating Information Resources and Services Available From Federal Websites: Final Report

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6565 Frantz Road
Dublin, OH 43017-3395
Library and Information Science Research Grant
Syracuse University Project Grant #35378874

June, 1997

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Acknowledgments

The authors wish to acknowledge the assistance of the following study team members who contributed to the preparation of this paper: Kristin Eschenfelder, Jennifer Myer, Jeffrey Rubin and Kevin Bontenbal. Diane Sotak helped conduct the literature survey for website assessment criteria.

Central to this study was the participation of two groups of Syracuse University IST Masters students who took time to assess federal websites and later attended focus groups. Their efforts greatly enriched the value of the study, and the researchers thank them for their time and insights.

During the course of the research many federal officials expressed interest in the study, and from them came useful material, observations, and insights. Their feedback helped guide the researchers to problem areas and key issues. The authors hope that they may benefit as much from this research as the researchers did from their input.

The study team also wishes to expresses its appreciation to the staff of Stat-USA, U.S. Department of Commerce, Washington, D.C., for generously providing time in the midst of busy schedules to the researchers for the site visit, and also for their candor on the topic of federal website administration.

Table of Contents

Acknowledgments ii

Executive Summary viii

Chapter 1: Introduction

Background 1
Research Goals 3
Assumptions and Limitations of the Study 4
Significance of the Study 6

Chapter 2: Policy Context

Overview of Existing Federal Information Dissemination Policies 7
The Paperwork Reduction Act 8
OMB Circular A-130 8
Electronic Freedom of Information Act 9
OMB Draft Guidelines for Agency Use of the World-Wide Web 10
Summary of Policy Issues 13

Chapter 3: Methodology

Federal Website Selection 14
Development of Evaluation Protocols for Situated, Technical, and Policy Assessments 16
Development of Think Aloud Protocol for Use in Situated Assessments 18
Website Assessment Techniques 20
System-Based Website Assessment 20
Website Mapping 21
Web Server Log File Analysis 22
User-Based Website Assessment 24
Situated Proxies' Assessments 24
Online Popup Questionnaires 27
Design-Based Website Assessment 28
Technical Assessments 28
Policy Assessment 29
Developer-Based Website Assessment 30
Site Visit 30

Chapter 4: Findings

Website Mapping 32
Web Server Log File Analysis 36

The Access_log 37
Analysis of Stat-USA Access_log 38
Situated Proxies Assessment 38
Focus Group 43
Findings 45
User-Based Guidelines 46
Technical Assessments 47
Findings 47
Policy Assessment 49
Findings 50
Site Visit 50
Findings 51
Dissemination of Findings 52

Chapter 5. Issues and Recommendations

Objective Questions 55
System Dependencies 56
Assessing a Moving Target 56
Conceptualizing Websites 56
Conceptualizing Webpages 58
Selection of Users/Assessors 59
Use of Structured versus Unstructured Assessment Techniques 59
Resource Limitations and the Need to Assess Federal Websites 60
Recommendations for Future Research 60
Importance of User-Based Evaluation 61

References 64

Appendices

1. System-Based Assessments 69
A. Website Mapping 71
B. Web Server Log File Analysis 83
2. User-Based Assessments 89
A. Situated Proxies Assessments Evaluation Protocols: IST Webmasters Focus Group 90
B. Intermediate Criteria 93
C. Criteria Linkages 96
D. Sign-up Sheet to Participate in Assessment of Federal Websites 98
E. Researcher's Instructions for Conducting Situated Analysis 99
F. Demographics and Survey Form 102
G. Assessment Criteria (Used) 103
H. Assessment Criteria (Revised) 105
I. Focus Group Probes 107
3. Design-Based Assessments 108
Technical Assessment Criteria
A. Summary of All Four Websites 109
B. National Institutes of Health 111
C. National Archives and Records Administration 113
D. Stat-USA Website 115
Policy Assessment Criteria
A. Summary of All Four Websites 117
B. National Institutes of Health 118
C. National Archives and Records Administration 119

D. Stat-USA Website 120
4. Developer-Based Assessment (Site Visit) 121
A. Probes 122
B. Website Administrators' Responses to Survey 125
C. Transcript of Videotape of Stat-USA Situated Assessments 127
5. Project URLs 130
6. Project Website 131
7. Project Abstract 139

List of Figures and Tables

Figure 1: Research Design 15
Figure 2: Mnemonics for Situated Assessors 19
Figure 3: Website Assessment Categories 21
Figure 4: Webpage "Hits" versus Webserver Accesses 38

Table 1: Overview of Selected Website Assessment Sources 3
Table 2: Situated Criteria for the Evaluation of Websites 26
Table 3: Technical Assessment Criteria 28
Table 4: Policy Assessment Criteria 30
Table 5: Map Statistics (WebMapper) 34
Table 6: Object Statistics (WebMapper) 35
Table 7: Status Summary (WebMapper) 35
Table 8: Situated Assessor Profiles 42
Table 9: Situated Assessment Data Summary 42

Executive Summary

In June of 1996, the Online Computer Library Center (OCLC), Office of Research, awarded a Library and Information Science Research Grant to Charles R. McClure and Steven K. Wyman, both of the School of Information Studies at Syracuse University, to explore the degree to which federal agencies' World Wide Web sites meet their constituencies' needs. The research began in August, 1996, and concluded in April, 1997.

Research Goals

The goal of this study was to establish analytical tools based on both technical criteria and user feedback by which federal website administrators may assess the quality of their websites. The study combined qualitative and quantitative data collection techniques to achieve the following objectives:

1. Identify and define key issues regarding representation and access to information resources through federal websites.
2. Identify and analyze key information policy issues related to the design, development, and management of Web-based information resources and services.
3. Establish evaluative criteria for reviewing federal websites
4. Evaluate a sample of federal websites
5. Suggest analytical tools with which federal website administrators can analyze site structure and use
6. Offer recommendations to increase the usefulness of federal websites to libraries and other users.

Progress toward these goals and objectives should provide a foundation for improving the design and operation of federal websites.

Methodology

This study was exploratory in nature and employed a combination of qualitative and quantitative techniques, providing both analytic and descriptive measures for reviewing federal websites. The methodology divided into four major categories: system-, user-, design-, and developer-based. Each category represented a distinct research approach to federal website

assessment, but the philosophy underlying the approach is that a system's users ultimately determine the success of that system. In this vein, federal websites were treated as systems with respective user bases. Even though the user-based assessment formed the core of the study, the other three approaches all focus on the utility of a website to its constituency.

Within the system-based method are website mapping and log file analysis. The study team used WebMapper (NetCarta), a commercial website management application, to gain structural surveys of the four federal websites being assessed. These surveys include error reports, applications operating from the site, internal and external links, gateways, and more. In order to gain a window into user movement through a website, log file analysis can be highly effective.

The user-based approach consisted of situated assessments of four federal websites -- the Department of Commerce, the National Archives and Records Administration, the National Institutes of Health, and Stat-USA. By "situated" we mean that each of the ten users (proxies) came to their assessment sessions with an interest in the content of the site which they reviewed. Either two or three proxies assessed the four websites. During one-hour assessments the researchers videotaped the computer monitor to preserve content context, and users' comments as they narrated their evaluations according to the Think Aloud protocol.

The design-based assessments divided into independent technical and policy evaluations conducted by three members of the study team. The design-based assessments, like the situated user assessments, followed scripted criteria. Technical elements included presentation / ease of use, content, usefulness, currency, navigation, help categories.

The fourth and final assessment approach entailed a site visit to Stat-USA. The Stat-USA is unusual in that it maintains a subscription-based service tailored to high-end (volume) users. It operates on a cost-recovery basis and by its second year of service was breaking even. The experimental character of the Stat-USA website made it an attractive case study. Even though generalizations from such an example must be made carefully, the Stat-USA website administrators had clear views of the site's critical success factors, as well as opinions about why a lack of

transferable to other websites is an open question. More study is required to examine costing issues of federal websites providing fee-based services.

Significance of the Study

It is useful to collect experiences of specific government website developers which may contribute to knowledge that can be more generally applied. Mistakes costly in terms of time and dollars might be avoided. Technical knowledge can enable other agencies to "leapfrog" certain hurdles. The data collection techniques and instruments developed and tested in this project can be used by federal Webmasters to improve their websites. The inclusion of user-based assessments are essential to developing high quality and useful websites. Thus, this research assists federal officials' deployment and use of Web-based information resources and services. But by the same token, the critical success factors discovered through this study may be transferable to website designers in other settings.

In this Web-based environment, however, there is the potential to provide a huge array of information products and services. The concept of Web-based information services is an evolving one. Assessment techniques, however, related to Web-based information services by specific audiences such as government officials, teachers, business persons, researchers, students, librarians, *etc.* are just in the development process. Thus, some key questions that will continue to be asked are:

- What are the scope and reach of Web-based information services?
- How much use do websites and individual pages receive and why are they used?
- What types of users access the website and to what types of services and activities do they connect?
- What are the costs for providing various types of Web-based services?
- How has access to and use of Web-based services affected organizations and individuals in terms of economic competitiveness, education, productivity, quality of life, and other traditional performance indicators?
- What types of performance measures are appropriate to determine the impact of Web-based services on various stakeholder groups?
- What types of evaluation tools can assist policymakers website managers, and researchers measure those identified performance measures?

To date, there has been little practical guidance offered to assess federal websites and Web-based services. As agencies implement new information technologies and expand Web-based services there will also be a need for evaluation methods and measures to demonstrate that the resources invested in such efforts have had some positive impact on the users they serve.

Chapter 1: Introduction

Background

The U.S. Government is the largest information provider in the world (Hernon, 1996: 1). The Government Printing Office processes more than 1.6 million orders and ships over 110 million publications annually (Office of Technology Assessment, 1993: 2). Somewhere between 189,000 - 237,000 citizens use federal depository libraries each week, up from approximately 167,000 in 1989. From the GPO Access website alone, users download an average of 2.5 million documents per month from over 70 databases (Baldwin, November 1996: 3). In the average week around 30,000 academic and business researchers obtain research results from the National Technical Information Service.

Electronic media permeate American society. A recently published report by Nielsen Media Research details the doubling in numbers of people in the U.S. and Canada using the Internet over an 18 month period ending January, 1997.[1] Increasingly, the federal government depends on digital systems to disseminate information (McClure & Ryan, 1996: 297-313). Among the new media, the World Wide Web brings together diverse technical elements into a still fragile, but promising confederation (DePompa, 1997: 38). What is now emerging is a dynamic platform on which publishing, communications, and data intermingle. Anyone with sufficient access and average computing resources can publish a website. No central authority controls what appears, no complete map to this new conceptual geography is yet possible, and no generally recognized standards for consistent presentation direct the millions of pioneers through the new frontier. Even so, the allure of the Web entices individuals and institutions alike to stake claims in this *terra incognita*. U.S. federal website administrators are deploying a better means of presenting government information to a growing online audience (DiCaterino and Pardo, 1996).

The growth in the number of federal websites is striking. The federal government began actively posting information on the Web in 1993. Now, nearly 900 federal websites may be accessed through a Web index at Villanova Center for Information Law and Policy, and this is not necessarily a complete listing <http://www.law.vill.edu/fed-agency/fedWebloc.html>. Yet, despite the rush by so many agencies to

[1] According to the Nielsen survey, approximately 50.6 million North Americans are accessing the Internet, 37.4 million of whom are using the Web.

establish a Web presence, few guidelines exist for how to accomplish this in an "efficient and effective" manner as mandated in OMB Circular A-130 regarding federal information resources and services (Office of Management and Budget, 1995). As this report was being prepared, the Office of Management and Budget issued another statement setting forth a set of principles for federal Web use (Katzen, 1997). There are a handful of preliminary guidance documents pertaining to individual agencies; the Office of Management and Budget issued draft memoranda in July, 1996 (revised in November of 1996) suggesting guidelines for Executive Branch websites (Office of Management and Budget, July 16, 1996 and November 17, 1996), and the NCSA/NSF World-Wide Web Federal Consortium in May of 1995 (updated November 1996), posted guidelines online <http://skydive.ncsa.uiuc.edu/consortium/guide/hmpggl.htm>. A variety of additional policy documents relate to the use of electronic media for disseminating federal information.[2]

Policy analysts are just beginning to consider these and related policy instruments and how they will affect the production and dissemination of government information in a Web context. To date, there are few national guidelines or criteria to assist federal website administrators assess existing websites; nor is it clear to Webmasters how they may include user-based criteria for planning/designing site development (Tillman, 1996; Stoker & Cooke, 1995; Internet Business Network, 1995). Assessment criteria that do exist either are largely based on anecdotal information, or are directed at websites oriented to marketing initiatives (Snyder, 1996). Table 1 summarizes the major categories into which most website evaluation efforts fall. Examples of authors for each category are offered, as well.

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[2] Portions of the *Federal Records Act* (*44 U.S.C.* Chapters 29, 31, 33, and 35), which pertain to agency dissemination of information through the Government Printing Office and the *Federal Depository Library Program* (*44 U.S.C.* 1902); relevant portions of the *Paperwork Reduction Act* (*44 U.S.C.* Chapter 35); and *Electronic Freedom of Information Improvement Act of 1996* (P.L. 104-231). Other regulations which potentially affect the development of federal websites include: *Freedom of Information Act* (*5 U.S.C.* 552), the *Privacy Protection Act* (*5 U.S.C.* 552a) or the *Computer Security Act of 1987* (*40 U.S.C.* 759). Furthermore, the article does not include an analysis of issues associated with agencies' charging for access to information, or the implications of the *American Disabilities Act of 1990* (*42 U.S.C.* 12101) and the *Rehabilitation Act Amendments of 1992* (*29 U.S.C.* 794); Establishment of Government Information Locator Service. (December 7, 1994). *OMB Bulletin 95-01*. Washington, D.C.: Office of Management and Budget; Application Profile for the Government Information Locator Service (GILS). (1994). *FIPS PUB 192* Washington, D.C.: GPO. Note as well White House policy statements such as that of Vice President Al Gore, *Creating a Government That Works Better & Costs Less: Report of the National Performance Review*. (September. 7, 1993). Washington, D.C.: U.S. Government Printing Office; and the Information Infrastructure Task Force, *The National Information Infrastructure: Agenda for Action*. (September 15, 1993). Washington, D.C.: National Telecommunications and Information Administration.

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Federal websites are capable of providing fast, cost-effective access to an abundance of government information stored in a variety of electronic formats. The convergence of quick and relatively easy website publication with the federal government's massive information output may at first glance seem harmonious. Often however, websites are built with little consideration of basic presentation standards and how such may affect the abilities of users to locate, trust and use public information provided online. Furthermore, it is important for agencies to provide information in a manner that best serves the interests of their users (Johnson, 1996). One of the best ways to achieve this result is by bringing the users into the process at an early phase in website development.

Table 1. Overview of Selected Website Assessment Sources

Library Science Perspective	Since the evaluation of information resources and the organization of information is inherent in the field of Library and Information Science, much of the literature pertains to the assessment of information content and its organization in the website.	Caywood, 1995; Pratt, Flanner and Perkins, 1996; Grassian, 1996; Tillman, 1996; Stoker and Cook, 1995; Klobas, 1995; McClements and Becker, 1996
Business Perspective	The literature from the business field focuses on designing websites for customer use, and some of the literature discusses marketing and advertising issues.	Internet Business Network, 1995; *WebResults*, 1996; Nash, 1995
K-12 Perspective	Most of the educational literature on website assessment comes from the K-12 level and focuses on the quality of the information content provided on the website.	McLachlan, 1996; Schrock, 1996
Computer Science Perspective	Except for the field of computer graphics, most of this literature from the field of computer science does not deal directly with website design. Many of the ideas presented within the computer science literature can be applied to the Web environment.	Mitchell, 1996; Snyder, 1996; Udell, 1996; Schneiderman, 1987; Fidel, 1987

Research Goals

The goal of this study was to establish analytical tools based on both technical criteria and user feedback by which federal website administrators may assess the quality of their websites. The research project began in August, 1996, and was completed in April, 1997. The study combined qualitative and quantitative data collection techniques to achieve the following objectives:

1. Identify and define key issues regarding representation and access to information resources through federal websites

2. Identify and analyze key information policy issues related to the design, development, and management of Web-based information resources and services

3. Establish evaluative criteria for reviewing federal websites

4. Evaluate a sample of federal websites

5. Suggest analytical tools with which federal website administrators can analyze site structure and use

6. Offer recommendations to increase the usefulness of federal websites to libraries and other users.

Progress toward these goals and objectives should provide a foundation for improving the design and operation of federal websites.

Assumptions and Limitations of the Study

Discussions among the researchers during the selection of methods and design of structured instruments showed that even within a small and more or less similar group, views could differ significantly over what was an appropriate approach for assessing websites. In part, the range of perspectives reflected differing concepts of what websites are, what they can or cannot do, and how best to devise a methodology which fairly represents the federal websites finally selected for assessment. Though this study does go some distance toward characterizing federal websites, it is still plain to the researchers that websites are chimerical. They may change suddenly and drastically. Multimedia features such as sound and video can radically alter the general experience of a website. Better conceptualizing websites, even though that may mean constructing an open-ended definition, will continue to be important if researchers are to effectively study Web technology, organization, and use.

Another area which requires attention is the nature of a website user base. It is presumed by the study team that users of a given website have some interest which overlaps the site content. This view led directly to the choice of a situated methodology augmented by the Think Aloud protocol. Despite the combined power of these two techniques, the research did not collect feedback from regular users. Nonetheless, it is our view that what this research intended to accomplish -- namely to develop and test quality criteria for assessing federal websites -- succeeded by using proxies. The proxies could be thought of as interested users of the websites they assessed. For most Web administrators, new users may serve as indi-

cators of new directions in information demand and use. New users may sometimes scrutinize a website quite carefully simply because they do not possess the experience of an environment that so often can blind one to the familiar.

In the early stages of the research the study team selected appropriate websites to evaluate. The federal government has many websites, most operating without clear policy guidance. One good way to select websites is through log analysis. Log analysis can indicate webpages which are heavily trafficked, or have other features drawing or repelling users. However, to obtain agency log files as an external agent can be difficult. The researchers were very fortunate that Stat-USA provided a sample of their website's use in the form of Access_log files. As potent as log analysis can be, it can also drift into sensitive areas. Issues of user privacy must be handled carefully, and therefore the analysis of log files should be well thought out. For this study the logistics of arranging receipt of log file data collection and analysis meant that the analysis was not completed until the later phases of the study. Ideally, log analysis and website mapping should be done prior to technical and policy assessments.

Regardless of the researchers' awareness of the changeable character of websites, to conduct this study "snapshots" of the four selected websites provided the research data. This was not longitudinal, in other words. The quixotic nature of the Web environment motivated the researchers to use videotaping to preserve the context of the situated users' assessments. Even so, by not including a longitudinal dimension in the research, significant changes in websites could go undetected. For instance, Stat-USA staff were in the process of comprehensively revising their website when this research began. They will have revised their site into a frame-based LotusNotes format by the time of this report, thus effectively addressing several shortcomings brought out by the assessment.

The technical and policy assessments presented some challenges to the researchers, which will be described in detail in the Findings section. In essence, because all the websites selected for this study were reasonably large (indeed, a criterion for selection), they also tended to be complex. A criterion that requires the assessor to respond either yes or no to whether there is a feedback button becomes something of an interpretation. Does this mean on every page? On the homepage? Is once enough to satisfy the spirit of the criterion or is something more frequent intended? Such quandaries emerged more often than the re-

searchers had originally anticipated. The issue becomes one of comprehensive assessment of all the site's webpages versus devising a valid sampling technique which may well miss key features of a website.

For the situated assessments, the researchers used small sample sizes. Two to three assessors evaluated any given website. While this may be sufficient to establish proof of concept, the mean values of such small samples reported in the User Based Findings should be considered as indicators, not judgments. A systematic replication of the situated assessment methodology tested here but with more assessors -- something that should be well within the capabilities of practically any federal agency -- would enhance the precision of the evaluation.

Other limitations of the study included time and money. For the funds available the research agenda was very ambitious. Multimethod data collection produced a sizable volume of data to be analyzed. The time required to thoroughly digest all the data was longer than the time available. In both time and expense the researchers strove to maximize results.

One of the stated aims of the study was to identify benchmark federal websites. It quickly became apparent that this hope would go unfulfilled. To accomplish such a task requires assessment of many more than four websites. That is not to say that the methodology presented here cannot be adapted to perform such a task, but rather that the task itself would be quite a different undertaking.

Significance of the Study

It is useful to collect experiences of specific government website developers which may contribute to knowledge that can be more generally applied. Mistakes costly in terms of time and dollars might be avoided. Technical knowledge can enable other agencies to "leapfrog" certain hurdles. Federal webmasters can use the data collection techniques and instruments developed and tested in this project can be used to improve their websites. The inclusion of user-based assessments is essential to developing high quality and useful websites. Thus, this research assists federal officials' deployment and use of Web-based information resources and services. But by the same token, the critical success factors discovered through this study may be transferable to website designers in other settings.

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Chapter 2: Policy Context

Rapid proliferation of federal government websites is outpacing federal information management policies and dissemination guidelines that address issues associated with the dissemination of printed publications. While many of the values reflected by these policies are still appropriate, *i.e.*, ensuring fair and equitable access to information for all citizens, and protecting information that may be sensitive or violate individual privacy, specific policies may not be practical for governing electronic information dissemination via the Web.

The federal government's rapid transition to Web-based information dissemination raises the following fundamental questions:

- Are federal websites being operated in a manner consistent with existing federal information policies?
- Are new policies needed, or should federal information policies be updated to more realistically reflect the capabilities of this new medium? If so, in what areas are new or updated policies most urgently required?
- Are federal agencies effectively employing the Web as an information dissemination channel?

Federal websites are capable of providing fast, cost-effective access to an abundance of government information stored in a variety of electronic formats. Yet to enhance the overall usefulness and impact of federal websites, careful consideration should be given to their purpose, structure, and operation. It is time to reexamine key federal information policies in light of the pending impact of this potent new medium. This report presents results addressing the above questions through assessment criteria and methods for evaluating federal websites.

Overview of Existing Federal Information Dissemination Policies

Although websites provide a new medium for disseminating government information, OMB clearly indicates that federal websites fall under the purview of existing policies governing federal information dissemination activities (OMB, November, 1996). These policies encompass a variety of information-related issues: *e.g.*, the types of government information that should be retained for storage in the National Archives; what should be distributed through the Federal Depository Library Program; whether and how the public should be charged for government information; and measures that should be taken to

safeguard and ensure the accuracy of information. The determination that federal websites must be operated in compliance with these policies portends consequences for federal website administrators. The following section discusses selected aspects of key policy instruments.

The Paperwork Reduction Act

As with many other policy issues, federal agencies must balance competing policy directives as they develop information dissemination programs. The PRA seeks to:

> Ensure the greatest possible public benefit from and maximize the utility of information created, collected, maintained, used, shared and disseminated by or for the federal government.... [and] provide for the dissemination of public information on a timely basis, on equitable terms, and in a manner that promotes the utility of the information to the public and makes effective use of information technology (*Title 44 U.S.C.* 3501 (2) and 3501 (7)).

On the other hand, *44 U.S.C.* 1108 cautions federal agencies to make certain that information dissemination products are necessary for proper performance of agency functions or, as indicated by the PRA, "minimize the cost to the federal government of the creation, collection, maintenance, use, dissemination, and disposition of information" (*Title 44 U.S.C.* 3501 (5)). In short, federal agencies are to maximize the usefulness of their information to the public -- presumably by giving the public greater access to it -- while minimizing costs associated with doing so.

OMB Circular A-130

Written before the Web rose to prominence, OMB *Circular A-130* is the *de facto* government-wide policy guidance for federal agencies using the Web as an information dissemination medium. In addition to directing agencies to maximize the usefulness of government information while minimizing dissemination costs, OMB *Circular A-130* instructs agencies to:

- Disseminate information products in an equitable and timely manner (Section 8.a.(5)(d)ii);
- Take advantage of multiple dissemination channels (Section 8.a.(5)(d)iii);
- Help the public locate the information, maintaining inventories of information dissemination products and developing search aids such as indexes and catalogs (Section 8.a.(5)(d)iv and Section 8.a.(6)(c) & (d) and OMB *Bulletin 95-01*);
- Make certain that members of the public with disabilities have a reasonable ability to access the information (Section 8.a.(6)(f));
- Coordinate with members of the public, and state and local governments to ensure that information products meet their requirements, and provide notice when substantially modifying or terminating existing information products (Section 8.a.(6)(i) & (j));
- Make government publications, including electronic information dissemination products, available to the GPO for distribution through the library depository program (Section 8.a.(6)(g) & (h));
- Avoid imposing improperly restrictive practices on subsequent uses of information by others -- particularly with respect to establishing exclusive distribution arrangements, charging fees or

royalties on subsequent re-dissemination of information, and charging user charges in excess of actual dissemination costs (Section 8.a.(7)), and;

- Establish information protection procedures commensurate with the risk and magnitude of harm that would result from loss, misuse, or unauthorized access to or modification of such information (Section 8.a.(9)).

OMB has revised Appendix IV of OMB *Bulletin A-130* so that it now addresses the underlying rationale for many of the policies listed above, and clarifies changes from previous versions relevant to Web-based federal information dissemination activities. For example, Appendix IV clarifies the definition of "information dissemination product" to include both information products and services to ensure that policies not be interpreted differently based on the manner in which the information is delivered. Of interest to federal website administrators, Appendix IV includes an extended discussion of the Federal Depository Library Program stating OMB's position that: "electronic dissemination products generally should be provided to the depository libraries" (*Federal Register* 34, February 20, 1996: 6448). The manner in which electronic products should be provided to depository libraries is not identified. However, if websites evolve into primary dissemination vehicles and even replace some traditional functions of the depository libraries, the stipulation takes on importance to website administration.

Electronic Freedom of Information Act

The Electronic Freedom of Information Act Amendments of 1996 (Electronic FOIA; *Title 5 U.S.C.* 552) propose to improve public access to federal information by directing agencies to make more of their information available in electronic form and to make reasonable efforts to provide records in the format requested. Among other things, the Act requires agencies to:

- Publish via computer telecommunications or other electronic means all information required to be published in the *Federal Register*;
- Make available a list of statutes relied on by an agency to withhold information;
- Make available for public access via electronic means agency materials previously available only through inspection and photocopying, and include in such materials specified information on major information systems;
- Provide requesters with records in the form or format in which they are maintained;
- Receive one-half of the fees collected from FOIA in order to offset compliance costs;
- Process requests on a first-in, first-out basis;
- Indicate where information has been deleted on the released portion of the record at the place where the deletions were made.

While the Electronic FOIA did not explicitly reference the Web, the direction for agencies to publish via computer telecommunications certainly appears to encourage federal agencies to use the Web to meet these requirements.

OMB Draft Guidelines for Agency Use of the World-Wide Web

In recognition of the increasing use of the Web by federal agencies and the implications of existing federal information dissemination policies on such practices, OMB developed and circulated draft policy guidelines for federal agency use of the Web as an information dissemination medium (OMB, July 16 and November 17, 1996). Although OMB was careful to point out that the guidance did not impose new requirements upon agencies, the memoranda did generate concern among many federal Web administrators.

The initial draft (July 16, 1996) raised considerable concern among agency Web administrators, some of whom questioned the practicality and the cost-effectiveness of applying existing federal laws to the Web. At least one agency official indicated that if OMB guidelines are issued as official policy, some "agencies would stop using websites because of the burdens imposed by strict interpretation of the Federal Records and Paperwork Reduction Acts" (Harrefeld, 1996: 1, 52). Such reactions by agency Web administrators highlight the significance of emerging policy and the possibility that tradeoffs in policy objectives may be required to optimize federal Web use.

The draft policies provided in this guideline provide a useful starting point for assessing federal information-policy implications of agency use of the Web. Key provisions of the draft memorandum are summarized below. According to one or both drafts:

- Agencies shall use appropriate management controls to provide reasonable assurance that information posted to their website is accurate, relevant, timely, and complete. The OMB emphasizes diligence but does not insist on absolute accuracy, suggesting a statement be included on the website reflecting when the information was last updated and reviewed for accuracy. This provision was omitted from the November 17 draft.

- An agency's website primarily supports the public affairs function of that agency and, as such, should be developed with access of the general public in mind.

- Agencies should inform visitors to their websites whether they can expect to receive responses to comments submitted on their website. This provision was omitted from the November 17 draft.

- Agencies should examine the appropriateness of the "linkages" between their websites and other websites with regard to sound public policy. For example, linkages to other government websites

would generally be considered appropriate while linkages to commercial sites would typically be considered inappropriate. This provision was omitted from the November 17 draft.

- Agency websites shall support only information directly related to the agency's mission. The agency website should not support personal information on agency personnel.

- Agencies should track the costs associated with maintaining their website and assess the effect of electronic publication on their traditional dissemination programs. This provision was omitted from the November 17 draft.

- Agencies shall not intentionally collect and maintain electronic mail addresses unless public notice of such collection is made and the information is maintained and used in accordance with a *Privacy Act* systems of record notice. The November 17 revision specifically classifies email addresses as "personal identifiers." Databases which allow a user to find a record via a personal identifier must submit to *Privacy Act* oversight. OMB advises that it is the intent to search the data with a personal identifier rather than the capability of searching the data that determines whether the data should fall under the *Privacy Act*.

- Regarding the coincidental collection of email addresses, such as might be accumulated while downloading comments from a discussion list that include an email address in the message header, agencies are instructed to treat these equivalently to routine paper correspondence and ensure that the addresses not be compiled into a searchable database.

- Email addresses maintained by a software program for the purpose of managing electronic discussion groups or mailing lists do not fall under the *Privacy Act* as long as agency personnel refrain from accessing or manipulating the email address lists or using the email address list for other purposes.

- Internet Protocol (IP) addresses are not personal identifiers and may be accumulated and manipulated in a database. The draft would require, however, that websites collecting users' IP addresses post "conspicuous" notice of such collection and its intended purposes.

- Agencies should provide an alternate means of access to information posted on their website.

- websites shall include location aids in compliance with Government Information Locator Service (GILS) policy and standards.

- Agencies must determine which information posted on their website constitutes an agency record, and if the information does constitute an official government record, treat the information in accordance with statutory requirements.

- Agencies should use their websites to augment their information dissemination -- not to replace an existing means of disseminating information. Record copies are to be maintained in an appropriate format for access and preservation.

- Website data collection efforts such as online surveys or questionnaires fall under the purview of the PRA and must be published in the *Federal Register*, approved by the OMB director, and assigned a control number to be displayed on the collection instrument. The second draft clarifies that website suggestion boxes and non-specific requests for comment are exempt.

- Agencies should treat information disclosures consistently. That is, if information is posted on an agency website, agencies are obliged to honor FOIA requests for the same or similar information.

- Agencies need to explore the use of additional controls to mitigate risks associated with permitting public access to federal systems.

The November 17, 1996 OMB draft provides a fair and comprehensive interpretation of existing federal information policies as they pertain to the operation and use of federal websites. Policy issues affecting the design and administration of federal websites are more fully discussed in Eschenfelder, *et. al.* (1997).

A recent OMB memorandum to federal Chief Information Officers articulated five principles of website planning and operation (Katzen, April 14, 1997).

1. Strategy and planning: Set clear strategic goals with performance measures demonstrating value; account for and maximize efficient use of agency resources; prepare for consistent service, maintenance and product delivery; and provide for the security of agency information systems.

2. Service delivery: Attend to the needs of all Americans, including the financially disadvantaged, those with disabilities, and those without reasonable access to advanced technologies; partner with other agencies and organizations to enhance customer service; deliver services in timely and equitable terms without neglecting traditional delivery methods.

3. Information access and dissemination: Strive for accuracy, relevance, timeliness and completeness of agency information made available electronically; provide cost-free access when practicable, but when fees are necessary limit them to the direct cost of dissemination; avoid improperly restrictive access practices; communicate regularly with the public in shaping and altering information services and products; support the Government Information Locator Service and disseminate available products through the Federal Depository Libraries.

4. Collecting information from the public: Collect from the public only information necessary for the performance of official functions; solicit public comment and customer feedback; respect and guard the public's privacy and ensure the security of their information; publish in the Federal Register agency activities which involve the collection and use (for system performance measurements or security) of email or Internet Protocol addresses, user statistics and activity logs, and similar data produced as a result of electronic interaction with the agency.

5. Management of federal records: Agencies should create, use, preserve and dispose of electronically published records in a manner consistent with the management of individual underlying records, recognizing that in most instances compilations of existing records are not considered by the National Archives as new and distinct records. Agencies should use, preserve, and dispose of information generated through interactive websites in a manner consistent with the NARA guidance for email and other electronic records.

The five principles outlined in the OMB statement are still under discussion, but range across a large number of issues. Principle number five addresses how to approach federal interactive websites (meaning those that deliver services or collect information via online application forms, surveys, etc.) from a records management standpoint. As stated above, current email and electronic records standards apply to websites. When the "interaction" between user and website results in a static document such as email or

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forms, existing standards can be applied. However, research by McClure and associates reveals how problematic the issue becomes when the website as a whole is considered as an official information entity (McClure and Sprehe, 1996).

Summary of Policy Issues

Federal websites have an opportunity to enhance public access to public information. Despite the positive role the Web can play in information dissemination, tradeoffs are likely to be involved. Policy-makers and website administrators should consider a range of issues such as the possibility of unauthorized modifications to government information. Are websites poised to replace print records, and if so, will eliminating paper publications and disseminating information via the Web promote a technological dependency which leaves out significant portions of society? What measures can be taken to ensure that the privacy rights of U.S. citizens and residents are protected?

Usually, resources of all varieties tend to be limited, making full compliance with strict interpretations of the existing policies to be impractical, and often counterproductive. The potential implications of electronic information policies need to be better understood. If it appears that resource-strapped agencies will avoid posting information on the Web in order to avoid burdensome administrative requirements, public interests will be poorly served. There may be more effective means to address the issues raised by these policies without sacrificing full public access to public information. Promising new media such as the Web should be utilized as tools to make access greater and information better. The methodology described in Chapter 3 is a step toward enabling the convergence of information access and quality.

Chapter 3: Methodology

The research reported is exploratory in nature, and employs a combination of qualitative and quantitative techniques, including content analysis and descriptive measures for each website reviewed (Miles & Huberman, 1994; Creswell, 1994). Figure 1 summarizes the research methodology. The researchers assessed four federal (Executive Branch) websites using a variety of analytical techniques, as outlined below. Additionally, researchers conducted a site visit to one of the four selected websites. The site visit provided to the researchers Webserver log file data, email reference statistics, and other background materials.

Federal Website Selection

To select a reasonably representative sample of federal webpages for assessment, the researchers established four basic conditions:

1. The website must have been in existence for a minimum of six months. Six months provides time for the customary startup glitches and inconsistencies to be identified and remedied. Put another way, the website has had time to "mature." If after six months problems persist, that may be an indication of more systemic problems.

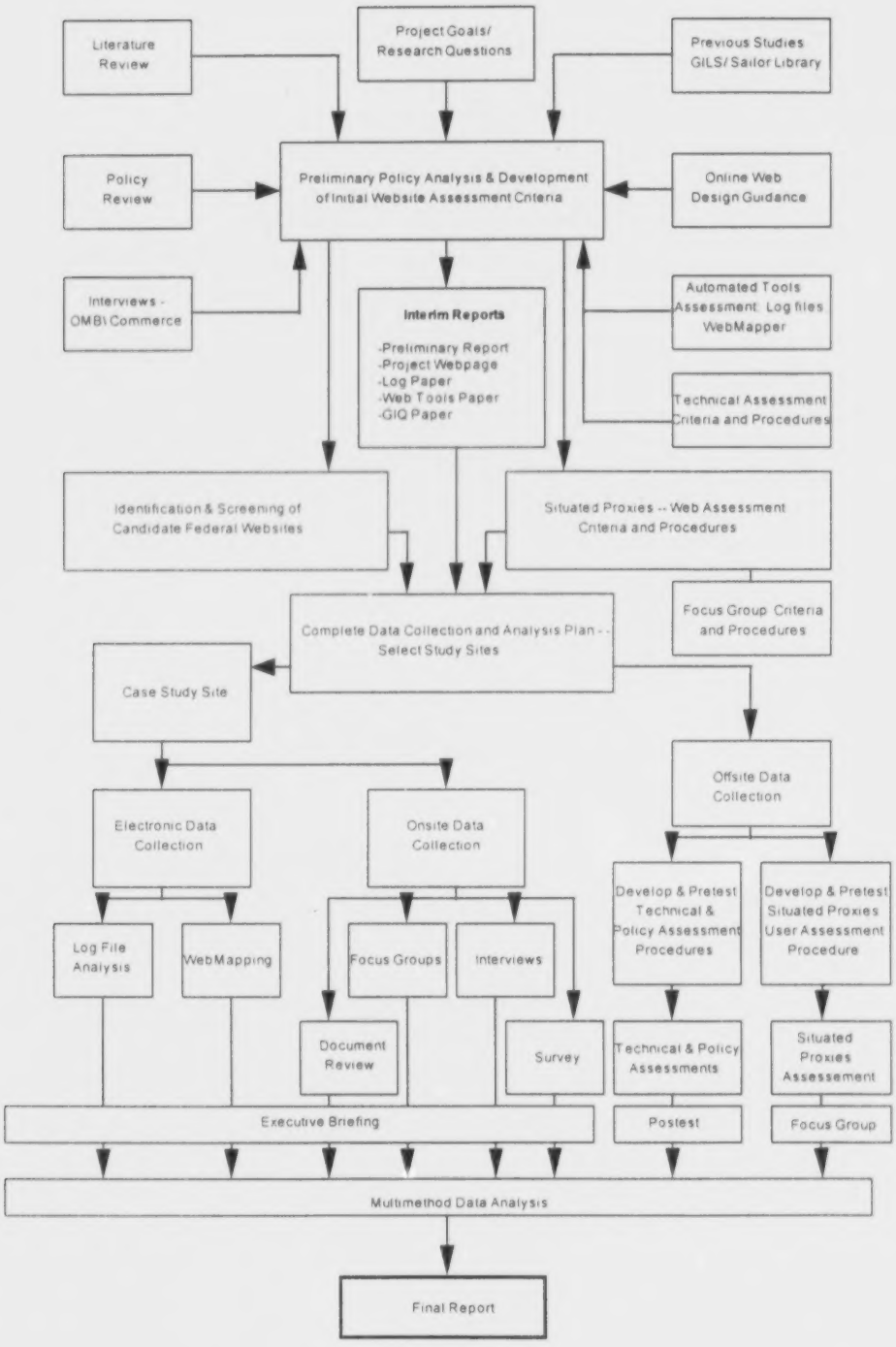
2. The website must have a person with designated technical responsibility for its maintenance. It became clear from numerous conversations between the researchers and various agency personnel that in many cases the website originated from the efforts of one or a few technical staff who knew some HTML coding and who perceived Web presence to be a benefit to the organization and/or to its constituencies.

3. Use statistics are being recorded. This means that Web server log files are maintained that may be used to determine usage rates, problem areas, and aggregate user profiles at the organizational domain level, *i.e.*: .gov, .edu, .com, *etc.* The logs help to identify particular webpages which have high error rates or other problems calling for closer inspection. The maintenance of use statistics is a selection criteria that applied only to the website participating in the site visit (Stat-USA).

4. The website must have significant content. This does not mean simply a substantial amount, but rather, some depth and complexity. One of the consequences of hypertext is that it promotes complexity. Not only may inlinks direct attention around the architecture of a website, but outlinks incorporate external websites or webpages into its content. For purposes of website selection, only the internal depth and complexity of websites are considered. For assessment, appropriateness of outlinks are considered, as well.

Using the above selection criteria, the study team compiled a candidate list of nine federal websites. Members of the study team addressed several graduate-level classes at Syracuse University School of Information Studies to recruit assessors to fill the situated proxies role for the corresponding assessments. Appendix 2B contains the original list of federal websites presented to the students, as well as summary

Figure 1
Research Design



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information about those sites.

It was crucial for the integrity of the situated methodology, as well as the validity of the approach used in this research that the assessors be interested users of the federal websites they evaluated. Because a primary aim of this study was to explore ways that federal Web administrators could employ user feedback in the overall assessment of their websites, the user proxies made the final selection of websites to evaluate from a list of qualified sites. The use of the term "proxies" for situated assessors should not be taken to mean that they are unrepresentative of "normal" federal website users. The user demographic of federal websites reflects the heterogeneity of the hundreds of websites themselves. Therefore, the situated users functioned as proxies in that they tested the assessment methodology. As will be discussed later in this report, the proxies felt that their experiences evaluating the websites served to validate the criteria-based assessments as a proof of concept.

The four federal websites selected by the situated users varied broadly in size, complexity, and mission. These sites were:

- The National Institutes of Health, which deals with a range of public health topics.
- The National Archives and Records Administration, which is responsible for federal information resources management.
- The Census Bureau, which has a large website operating under the auspices of the U.S. Department of Commerce.
- Stat-USA which, like the Census Bureau, is attached to the U.S. Department of Commerce. Stat-USA provides U.S. statistical data to its website's visitors.

Stat-USA administrators agreed to host a site visit by the researchers, and became the case study for the combined multimethod assessments. Stat-USA maintains a fee-based website subscription service which managed to recover its operating expenses during the second year of the website's operation.

Development of Evaluation Protocols for Situated, Technical, and Policy Assessments

The study team developed and pretested three sets of questionnaires containing scripted assessment criteria. These efforts drew on previous work by McClure and Lopata (1996), and Bertot and McClure (1996). The first set of scripted criteria applied to the situated proxies' assessments, the second to

technical elements of websites. The third dealt with the conformance of the websites to policy guidelines about federal information dissemination, and particularly to website development.

The study team developed the assessment criteria from four sources:

1. A similar website assessment study which focused on the Maryland State Library Sailor Network (Bertot & McClure, 1996)
2. A literature review conducted by members of the research team, including both bibliographic sources and online searching
3. An intermediate version of website evaluation criteria previously developed by the study team (Eschenfelder, Beachboard, McClure & Wyman, 1997)
4. Comments collected from a focus group held in October 1996 of experienced website developers.

These sources provided a survey of existing assessment criteria and approaches, and methods for selecting and refining them into more effective forms.

Prior to conducting evaluations, the study team collected assessment criteria through a literature review. Team members separated the criteria into groups according to the types of websites to which they applied. For example, many existing assessment criteria are directed at raising a website's visibility for commercial purposes. Many of these were not applicable to federal websites were disregarded for this study. Another category which attracts evaluators is the aesthetic sophistication of a site. This last criterion is not important to this study.

In developing a survey instrument, the study team initially decided to adapt the Sailor study questionnaire, cited above. In reviewing the Sailor instrument and that study's *Final Report*, the team concluded that the Sailor instrument, as written, was too lengthy and broad in scope for the purposes of the present study. Having narrowed the scope of the instrument, the study team held a focus group of six experienced website designers and to review some of the proposed questions and seek suggestions for new questions. Study team members circulated a draft of the assessment criteria to experienced website developers from the School of Information Studies' graduate computer lab. The input from these experts helped to identify problematic or ambiguous criteria. After assessing websites of their own choosing with a prototype of the scripted criteria the subjects participated in a debriefing session. This focus group provided a

forum for recommendations to the study team for refinements to the criteria. Some of the key issues raised by the group included:

- Will users asked to assess a website with splash pages incorrectly answer questions about the agency "homepage"? Splashpages set the mood or site metaphor, but contain very little information. When referring to an agency "homepage," one usually thinks of the first page that appears when a user accesses a site. Some styles of homepages however, use "splash pages" as a first page.
- To what extent can a user easily distinguish between a plain graphic and a graphic which serves as a link?
- To what extent is navigational assistance for a page unnecessary, if good page designs do not require navigational assistance information?
- How can good survey questions be developed with no knowledge of the agency site's primary users or target audience?

The study team combined the technical and policy criteria into a single assessment session. The reason for this was pragmatic: The first task was believed to require neither user feedback nor expertise, and so in principle could be accomplished by anyone. The policy assessment, on the other hand, required special skills. The policy assessors doubled as the technical assessors to conserve time and expense. The assessors answered the technical criteria after exploring each of the four websites approximately one hour apiece. Policy assessments took somewhat longer.

Development of Think Aloud Protocol for Use in Situated Assessments

The researchers pretested the situated assessment protocol that was based on the "Think Aloud" procedure, which as described by van Someren, Barnard and Sandberg, "consists of asking people to think aloud while solving a problem and analyzing the resulting verbal protocols" (van Someren, Barnard & Sandberg, 1994: xi; also Shapiro, 1994: 1-14). Because websites are dynamic by nature, the researchers determined that videotaping the monitor display during the assessors' searches would preserve the specific context of their searches, retain relevance to their commentary, and capture their verbal comments. Videotaping did not occur until the situated proxies assessments.

Using the information and suggestions from the Webmeisters, the study team revised the scripted criteria for the situated and technical assessments. See Appendix 2C for the linkages between user questions and selected assessment criteria. Other survey instruments included demographics questionnaires and

focus group probes for the situated users and the site visit participants. Appendices 2F and 2I provide reproductions of the instruments.

The study team administered a second pretest later to three additional graduate students specializing in information retrieval. Except for no videotaping, the second pretest sessions followed exactly the procedure to be used with the situated proxies. The purpose of this additional step was to detect any remaining glitches in the overall approach. During this exercise the study team noted that as the assessors became involved in the websites they forget assessment criteria. As a result of the second pretest, for the full assessment the researchers placed a small banner (Figure 2) at the top of the monitor of the computer that the assessors used as a mnemonic for the categories to be addressed.

Figure 2: Mnemonics for situated assessors

• **Navigation**	• **Quality**	• **Usefulness**	• **Presentation**
Buttons	Unbiased	Good Organization	Useful Headers
Ease of Moving Around	Fulfills Needs	Clear Scope	Good Graphics

The study team intended the banner to focus the assessors' comments on the selected assessment criteria. Situated assessors viewed the assessment criteria for a few minutes prior to conducting their online sessions, so that as they conducted their sessions they would be cognizant of the types of criteria they would address at their session's conclusion.

The situated proxies verbalized their thoughts/reactions as they moved through the websites. Immediately after finishing their Think Aloud assessment of the selected site, the situated proxies filled out a form containing assessment criteria. The study team analyzed the resulting sessions according to basic content analysis techniques (Weber, 1990). All but one of the situated assessors participated in a focus group within a week of the online sessions. Suggestions made during the focus group led to refinements in the assessment instruments, to the development of probes for the site visit, and to an 11-minute videotape composed of portions of three assessment conducted on the site visit website. Researchers played the videotape during the site visit.

Website Assessment Techniques

The techniques developed by the researchers to assess federal websites divide into four general categories: System-based, user-based, design-based, and developer-based. In the original *Research Proposal* six data collection activities were outlined. Of those six, the researchers dropped online popups for reasons described below. However, it became possible during the course of the research to add Web server log file analysis to the project. While popups offered a means to collect user feedback to elements of the selected websites, they would have been fairly unobtrusive and limited to analysis within the User Based general category. Log file analysis, on the other hand, while largely system based, also provides a means of observing traffic through a website, and is therefore arguably a user based option as well. In fact, several of the sub-categories outlined below interconnect and inform the others. Due to this fact, the research has an inherently iterative character: As the research unfolded, lessons learned during the performance of one task led to refinements in the instruments and methodology of that task, and frequently to others.

System-Based Website Assessment

Website Mapping

Objectives:

- Evaluate a sample of federal websites
- Offer recommendations to increase the usefulness of federal websites to libraries and other users
- Indicate analytical tools with which federal website administrators can analyze site structure and use.

The study team used a website management application, WebMapper™, by NetCarta, to obtain a structural overview of each site.[3] This commercial package detects obsolete hyperlinks, indicates whether links were internal to the site or directed the user to external websites. The WebMapper application detects duplicate pages, in addition to giving counts and locations of all links, images, applications and media within, and linking to, a website. Objects such as video, Internet applications (*e.g.*, .pdf files generated by Adobe Acrobat), sound, and gateways get identified and assigned icons, which may in turn, be summarized

[3] After reviewing several off-the-shelf applications, the study team selected NetCarta's WebMapper™ to accomplish this task. Microsoft Corp. recently acquired NetCarta. Product details may be reviewed at <http://www.microsoft.com/corpinfo/press/1996/dec96/netcarpr.htm>.

in specific reports. WebMapper detects a variety of structural errors (including 404 errors "file not found"). Since WebMapper can survey a site without special permissions (one study website had numerous passworded pages which mapped without any problems), the researchers attempted to map all four federal websites selected for this study.

Mapping begins at the selected site's homepage, and then proceeds to identify and map descending levels until it reaches a point where it finds no further links or objects. One of the most efficient means to map a site is to download the structure into a local cache. To do so can be memory intensive. One of WebMapper's most useful features is its ability to compare a website structure at two points in time. This option permits the Web administrator to review all changes made to a site from one mapping to the next. The researchers did not include a longitudinal component in this study, though.

Figure 3: Website Assessment Categories

I. System-Based

A. Website mapping (all websites)

B. Web server log file analysis (Stat-USA)

II. User-Based

A. Situated proxies assessments (all websites)

1. Website selection
2. Pretest
   a. IST Webmasters
   b. IST graduate students
3. Online assessment instruments
   a. Researchers' script
   b. Demographic form
   c. Assessment criteria (used)
   d. Assessment criteria (revised)
4. Focus group material
   a. Probes
   b. Transcript

B. Online popup questionnaires (dropped from study)

III. Design-Based

A. Technical assessment (all websites)

B. Policy assessments (all websites)

IV. Developer-Based

Site Visit (Stat-USA)

1. Interviews
2. Focus group
3. Probes
4. Demographic form
5. Videotape showing

Website mapping is a system-based data collection activity involving no user feedback. Webmapping is a data collection activity that applies to all four websites assessed in this study. Although the Webmapping application does not provide any user data for the website, in concert with server logs a powerful analytical combination results. The

present study compares the output of the Site Summary Report which gives a detailed overview of an entire site:

- Object Statistics: The number and size (where relevant) of pages, images, gateways, major mime types, and other resources.
- Status Summary: The counts and error status of onsite and offsite objects (pages and other resources) and links.
- Map Statistics: Information about the date and time your site was mapped, the number of levels mapped, and the average number of links per page.
- Server Summary: Information about a site's server.

The Webmapping application produced reports providing indicators of pages that may be especially complex or central to the overall website. This is an unobtrusive data collection technique that did not require participation of website administrators of the mapped sites.

Web Server Log File Analysis

Objectives:

- Evaluate a sample of federal websites
- Offer recommendations to increase the usefulness of federal websites to libraries and other users
- Indicate analytical tools with which federal website administrators can analyze site structure and use.

The study team prepared methods to assess four types of log files: access, agent, error, and referrer (Bertot, McClure, Moen, & Rubin, 1997; Stout, 1997; Noonan, 1996).[4] One federal agency -- StatUSA -- agreed to permit the researchers to analyze its Webserver log files (Rubin, 1996). One type of log file, the error_log, for instance, allows the detection of webpages or hyperlinks that may pose problems to the user. Examples could include slow page loads, or defunct links. The files which the study team ultimately received included only access_logs for an eight-day period. Even limited to the access_logs, however, useful information about website use came to light. Details can be found in the Findings section. A study team member designed software for statistical analysis of the log files using custom PERL and CGI scripts (Rubin, 1996; Bertot and Rubin, 1997). Details of this portion of the research effort are available

[4] Descriptions of what can be accomplished through log file analysis is currently available at <http://istWeb.syr.edu/stats.html>. See also Rubin, 1996; Bertot, McClure, Moen, & Rubin., 1997; Stout, 1997.

through the Web at the OCLC Project webpage under the title: "World-Wide Web Access Statistics for istWeb/ syr.edu." <http://istWeb.syr.edu/Project/Faculty/fedweb.html>

There are four variables in the access_log which can be used for analysis:

1. *Domain name or Internet Protocol (IP) number*. Here is a sample line of text from an access_log: smx-ca8-50.ix.netcom.com - - [30/Sep/1996:02:57:07 -0400] "GET /Proj/main.html

In this example we know that the user's computer had the following domain name: smx-ca8-50.ix.netcom.com. In the United States six suffixes are used to describe an organization type (though recent developments indicate an impending expansion of the present nomenclature)[5]:

- .com - US commercial business (*e.g.*, microsoft.com, sony.com)
- .gov - US governmental agencies (*e.g.*, whitehouse.gov, epa.gov)
- .edu - US Educational (colleges, universities) (*e.g.*, syr.edu, bu.edu)
- .net - US network providers (*e.g.*, internic.net, internet.net)
- .org - US non profit organizations (*e.g.*, madd.org, greenpeace.org)
- .mil - US military (*e.g.*, army.mil, navy.mil)

The user in the example connected to the Web server from a commercial network. The domain can be broken down further to the sub-domain; for example, how many times microsoft.com, ibm.com or us.mil connected to the website. It can also useful to know how many hits the server is getting from countries outside the United States.

2. *Date and Time*. Using the same example, we know that the user accessed a page on September 30, 1996 at 2:57:07 a.m. on a twenty-four-hour clock.

3. *Item accessed*. The word "item" can mean an image, movie, sound, or HTML file. The above example indicates that the visitor accessed the page *main.html*. Note that the full path name (from the document root) is given to avoid confusion, (*e.g.*, there may be more then one main.html on a server). The "item accessed" statistic can show a website administrator the most or least successful parts of a site.

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[5] During preparation of this *Report* the International Ad Hoc Committee on Top Level Domain (Internet) Names issued a *Memorandum of Understanding* proposing the following seven additions to the current IP domain types:

.firm	for businesses, or firms
.store	for businesses offering goods to purchase
.web	for entities emphasizing activities related to the WWW
.arts	for entities emphasizing cultural and entertainment activities
.rec	for entities emphasizing recreation/entertainment activities
.info	for entities providing information services
.nom	for those wishing individual or personal nomenclature

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4. *Threading of Users*. Understanding the path (thread) through which a user navigates a site can unfold multiple uses, such as:

- Entrance: The percentage of users who enter a site at the homepage, as opposed to directly accessing a page within it. This can help determine where to put an announcement (*e.g.*, new content). If a Web administrator puts an announcement only on the homepage a large number of users who bypass the homepage will never see the announcement.

- Exit: The page(s) from which users most frequently leave a site. It could be that a large number of users leave a site on a specific page. This alerts a Web administrator to re-examine that page. Maybe a link is down, maybe a graphic is taking to long to load, maybe the content needs some work.

  Clock analysis: The amount of time users spending on pages. Although a full page of text which receives an average of 800 accesses a week might seem popular, if the average time a user looks at that page is a few seconds there may be problems with it.

- Download time: How long a webpage takes to load. Users access sites with different bandwidth constraints (*e.g.*, 9600, 14.400, 28.800 bps, ISDN, Ethernet). A page that takes six seconds to download for one user, may take six minutes for another.

- Analysis of agent_log: Can tell what sort of browser the use to access the website. Netscape's Navigator and Microsoft's Internet Explorer are graphical browsers, but there are still people who depend on, and perhaps prefer, textual browsers such as Lynx. Agent_logs can also tell the website administrator which version of the browsers connect to the site, and which operating systems the clients are using (*e.g.*, Windows; 32 bit, Macintosh; PowerPC, SunOS; 5.3).

Details which the access_log collects on clients connecting to a website can be very useful to the website designer and administrator in providing an environment which significantly enhances accessibility or, at least does not hinder users' access to information.

User-Based Website Assessment

Situated Proxies Assessments

Objectives:

- Establish evaluative criteria for reviewing federal websites
- Evaluate a sample of federal websites
- Identify and define key issues regarding representation and access to information resources through federal websites
- Offer recommendations to increase the usefulness of federal websites to libraries and other users.

Situated proxies assessed the four selected federal websites and subsequently participated in a focus group to discuss key issues and problems. Proxies assessed websites according to scripted criteria and then evaluated the criteria themselves. The proxies thus played a dual role in this study. At least two

proxies explored each of the four websites selected. The study team encouraged the situated proxies to respond as naturally as possible to their respective websites and to consider criteria other than those supplied by the researchers. Each session lasted approximately one hour and had the following structure:

- Orientation: Description of Think Aloud technique, read through of criteria, assessors complete demographics form -- 10 minutes
- Search session: Videotaped assessments -- 20 - 40 minutes
- Debriefing: User provided summary of overall encounter. User also could evaluate the criteria themselves and indicate any additional information they felt should be included -- 20 minutes.

Shortly after completion of all situated assessments, the proxies and researchers met collectively to discuss the search sessions and to further refine the criteria into a more concise, effective set.

A website's presentation, contextualization, organization, and ease of use are all factors that affect every user's ability to access and utilize website contents effectively. Assessing some of these characteristics entails subjective judgments. To test assessment criteria that address subjective elements of website design, the researchers recruited volunteers from graduate courses in Syracuse University's School of Information Studies. Ten students participated. These students served as "proxies" of ordinary users of each of the four federal websites included in the study. To enhance a naturalistic approach, each student selected a website to assess from a list provided to them by the researchers. To their assessment sessions they each brought a specific question related to their expectation of what information that website was likely to contain, against which they could evaluate the features and effectiveness of the site. In this sense, the proxies may be considered "situated" within an information problem context (Dervin & Nilan, 1986). The situated assessment criteria divided into two main categories, with a "general" category for several criteria thought to be important but not well-suited to the major divisions. The main categories for situated assessment criteria were: A. Ease of use -- presentation and navigation; and B. Content -- quality and usefulness.

Table 2. Situated Criteria for the Evaluation of Websites

EASE OF USE	CONTENT
A. Presentation Issues	**A. Quality Issues**
1. To what extent are the text headers understandable?	1. To what extent did the site present different types or sources of information about your topic, thereby avoiding bias?
2. To what extent do the headers accurately reflect the content they describe?	2. To what extent does the content fulfill your needs?
3. Rate the overall site design	3. To what extent does the site provide in-depth information?
4. To what degree was the information at the site located where indicated by the headers?	4. Rate the overall quality of the site
5. To what extent is the design consistent throughout the site?	5. I would recommend this site to a colleague.
6. To what extent is the use of graphics appropriate for the site?	6. To what extent do you think the information provided by this site is true or correct?
7. To what extent are any of the visual elements distracting?	7. To what extent does information quality vary within the site?
B. Navigation Issues	**B. Usefulness Issues**
1. The graphics helped me find my way around the site.	1. The content of the site matched my expectations.
2. It was easy to move to where I wanted to go.	2. The site clearly indicated its scope and content.
3. It is easy to understand what the navigation icons mean.	3. The site clearly described its services and information.
4. It is easy to find what I want without using a search engine.	4. The site organized its information in a way that was easy for me to understand.
5. Chance played a big part in my finding the information I wanted.	5. Using this site would enable me to accomplish my desired tasks more quickly.
	6. The site provided the precise information I needed.
	7. The information on the site was relevant to me.
	8. I understand the purpose of this site.
C. General Questions	**C. Open-ended Questions**
1. It would be easy for me to become skillful at using this site.	1. Which aspect of the site did you like the most?
2. The site was easy to use.	2. Which aspect of the site did you like the least?
3. Teaching a beginner to use this site would be easy.	3. Please make one suggestion for improving the website.
4. It was easy to provide feedback to this site.	

Online Popup Questionnaires

Objectives:

- Establish evaluative criteria for reviewing federal websites
- Evaluate a sample of federal websites
- Identify and define key issues regarding representation and access to information resources through federal websites

In concert with the agency participating in the case study, the researchers intended to install hyperlinks from that website to two online popup questions chosen from situated proxies' assessment. The popups would have served as a proof-of-concept for collecting online user feedback in response to tested criteria. The period of popup data was to be two weeks. As described earlier in this document however, website administrators concluded that the popup technique risked annoying frequent website users. Furthermore, technical problems emerged whose solutions exceeded the scope of the project. Consequently, it became necessary to eliminate the online popup questionnaire data collection from the study.

Design-Based Website Assessment

Technical Assessments

Objectives:

- Establish evaluative criteria for reviewing federal websites
- Evaluate a sample of federal websites
- Identify and define key issues regarding representation and access to information resources through federal websites

The technical assessments considered elements of website design and operation. The assessment criteria divided into the following categories: A. Ease of Use issues -- presentation, navigation and help; B. Content issues -- quality, usefulness, and currency. Determining if the site includes a functioning user feedback feature or whether its hyperlinks work was not viewed as requiring much judgment. Therefore, the technical assessment was intended to be an objective assessment which asked how well the site functioned technically, regardless of content. A number of scripted criteria used in the technical assessment derived from previous research (Bertot and McClure, 1996). Others came from the literature review. Using scripted criteria, three members of the study team assessed the four selected federal websites. Appendix 3A describes the criteria employed for the technical assessment.

Table 3: Technical Assessment Criteria

Technical Criteria	Census	NIH	NARA	Stat-USA
Content: Quality Issues				
1. Do hyperlink headings and descriptions match the information found through the links?				
Usefulness Issues				
1. Are descriptions given to further describe the headers?				
2. Are services offered on the site?				
3. Are the services functional?				
Currency Issues				
1. Does the website include dates indicating when pages were last updated?				
2. How long since the last update?				
Ease of Use/Presentation Issues				
1. Are the banners consistently designed?				
2. Are the banners consistently placed?				
3. Are the navigation bars consistently designed?				
4. Are the navigation bars consistently placed?				
Navigation Issues				
1. Do hyperlinks connect to gopher menus?				
2. Is any of the site restricted by passwords?				
3. Is the page longer than three screens?				
4. Do pages longer than three screens provide anchors?				
5. Does the site consistently differentiate between graphics and graphical links?				
6. Does the site have a consistent way of indicating text and graphical hyperlinks?				
7. Do you need to use the browser to navigate?				
8. Does each page provide an indication of where you are in the site?				
9. Does each page indicate what site you are on?				
10. Does the site warn you when you take an outside link?				
Help Issues				
1. Is there a person or address that can be reached to provide feed back or to ask questions?				
2. Are large documents broken up into subsections?				
3. Are indexes provided for large documents and subsections?				
4. Does the site provide a download option for large documents?				
5. Does the site warn you about file sizes?				
6. Is a text only version of the site available?				

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Three members of the study team conducted the Technical Assessment. Most of the technical aspects of the assessment evaluated objective website elements which did not require situated users to make evaluations. For example, it might be deemed important to know if a feedback mechanism of some sort exists on the website. This requires a simple observation to confirm, and therefore was considered an objective judgment.

Policy Assessment

Objectives:

- Establish evaluative criteria for reviewing federal websites
- Evaluate a sample of federal websites
- Identify and define key issues regarding representation and access to information resources through federal websites
- Identify and analyze key information policy issues related to the design, development, and management of Web-based information resources and services.

To conduct a policy assessment of the selected websites, the assessors relied on the literature review prepared for this study (Majchrzak, 1984: 92-100). The literature included draft policy documents, as well as other information on conditions and issues being considered by federal officials in regard to the World Wide Web.[6] The federal World Wide Web Consortium offers a good beginning at addressing some of the technical aspects of website development <www.dtic.mil/staff/cthoms/ guidelines>. Appendices 3C-D describes the criteria employed for the policy assessments.

The researchers assessed the policy contexts of the four selected websites. The policy assessment proceeded from the fundamental question: How well do the websites conform to existing federal guidelines for information dissemination? To answer that question, the researchers located and compared policy documents targeting either government-wide or agency-specific website development and maintenance.

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[6] Guidelines for Agency Use of the Internet . . . (*op. cit.*), Office of Management and Budget; Use of the Internet. <Http://www.os.dhhs.gov> Department of Health and Human Services; Guidelines for Establishing and Maintaining a Department of Defense Web Information Service. <http://www.dtic.mil/defenselink/Webguide.html> Department of Defense; World Wide Web NIH Guidance (1995), <http://www.nih.gov/od/oirm/ guideli2.html> National Institutes of Health; World Wide Web Home Page Guidelines. (May 6, 1995), <http://skydive.ncsa.uiuc.edu/consortium/guide /hmpggl.htm> NCSA/NSF World-Wide Web Federal Consortium; WWW Server Standards and Guidelines. <http://inet.ed.gov/ ~kstubbs/ wwwstds.html> U.S. Department of Education; MSFC Guidelines for Administering World-Web Resources (1995) <http://www.msfc.nasa.gov/Webmasters/policy/ guidelines.html> Marshall Space Flight Center - National Aeronautics and Space Administration; DTIC WWW Sever Standards and Guidelines. (*Final Draft*: 4/24/95). <http://www.dtic.dla.mil/staff/ trefzger/ standards.html> Defense Technical Information Center; Policy for Internet Information Dissemination Using the World Wide Web. (*Draft*: 8/9/94). <http://banjo/ cise-nsf.gov/cise/ CISEWebPolicy.html> National Science Foundation.

Details of the policy assessment framework developed and applied by the researchers to the federal websites in the study can be reviewed in Eschenfelder, Beachboard, McClure and Wyman (1997). The researchers concluded that the policy assessment portion of the study required a degree of expertise difficult to operationalize in a user feedback study. For this reason, three research team members performed the policy assessment according to scripted criteria developed for the task.

Table 4: Policy Assessment Criteria

Policy Criteria	Census	NIH	NARA	Stat-USA
1. Does the website provide an email link to a Web administrator?				
2. Does the site offer users the opportunity to make comments about the site's content or design?				
3. Is there indication that visitors should expect responses to their comments?				
4. Is there a notice of when the website or specific pages were last updated?				
5. Does content appear appropriate for public access?				
6. Does content appear appropriate for the agency's mission?				
7. Does content appear to advocate political positions?				
8. Are there external hyperlinks to commercial sites on the website?				
9. How appropriate do links to commercial site seem?				
10. Are any data collection mechanisms included on the website?				
11. Do data collection mechanisms appear appropriate in terms of the agency's mission?				
12. Does the website provide pointers to alternative means of accessing the content (telephone numbers for ordering paper copies)?				
13. Are the location aids GILS compliant?				

Developer-Based Website Assessment

Site Visit

The study team combined the research techniques in a site visit to one of the four selected federal websites: Stat-USA, operating from within the U.S. Department of Commerce. Stat-USA availed itself to the researchers as a case study (Yin, 1994). The site visit was composed of individual interviews with key personnel involved in website development and maintenance, and a focus group of those interviewed and others invited by the head of the Stat-USA operation. The researchers distributed probes to the focus group participants for discussion (see Appendix 2I). Many of the probes derived from the situated assessors' feedback and subsequent focus group. Also, federal participants filled out a demographics form which

included some open-ended questions regarding the Stat-USA's experience and opinions regarding federal website design and operation (see Appendix 4B). During the focus group the researchers showed a video-tape of three situated assessors' evaluations of the Stat-USA website and then discussed the contents of the tape (see Appendix 4C for a transcript of the videotape).

Chapter 4: Findings

This chapter presents results of the data collection efforts. Each collection effort is presented individually. The data collected during the present research is very heterogeneous, ranging from statistical measures of user log files and location and counts of website errors, to survey and interviews. Analysis between data collection categories requires resources that exceed the scope of this study, but in some cases, the researchers identified ways in which one set of findings correlates to another.

A general result that emerged as the research progressed was the lack of a clear baseline from which to assess websites against one another. It is doubtful whether such an indexing might have merit, since the purposes, content and organization of federal websites can differ widely. Overall, the research findings support the methodological approach developed by the researchers for evaluating federal websites. However, one of the original expectations of the researchers was that the assessments could help to identify benchmark federal websites. At the least, many more websites will need to be assessed before a "best practices" standard can be set (Novak and Hoffman, 1996). Furthermore, websites are typically highly dynamic. If one site is designated a benchmark, given certain contexts and conditions, if its administrators revise it the next day, does the designation stand? A better approach to benchmarking federal websites may be to follow-through with an individual assessments and rate the site against the evaluative criteria rather than compare it to other websites. Accordingly, since it was never an aim of the researchers to establish a rating index (which might erroneously suggest an objective standard), the results reported in this chapter maintain a general character, with a tighter focus given to the Stat-USA case study. A principle objective of the researchers was to determine the validity of the methodological approach to assessment described in this study; and to that aim the analysis primarily applies.

Website Mapping

The following tables illustrate a range of important features of three of the four federal websites selected for the present study. At a glance, basic comparisons may be made between the depth and complexities of the three sites. In order to fairly assess the data presented below, the reader should bear in mind that major differences exist between the three websites in a variety of ways. Each organization's

mission and functions are highly specific. Due to the differences in mandates, the information content varies a great deal from one site to the next. Stat-USA, is a fairly self-contained and autonomous entity which provides to its subscribers large databases; NARA offers much more archival materials; and the NIH website is comprised of an association of 24 separate institutes, centers and divisions making it organizationally complex. Organizational imperatives tend to be reflected in the websites' design and maintenance, although Web mapping reveals subtleties in those selected images. Data organized into three tables appearing later in this chapter provided the researchers glimpses behind the curtain, into the structural systems that undergird information presentation and use, but systems important to the overall accessibility of the websites.

The Map Statistics data Table 5 is straightforward. The Stat-USA website directory structure extends two levels deeper than either NARA or NIH. Stat-USA's six levels is relatively deep, and may indicate to the Web administrator that the site is particularly complex, or that protracted searching for information may be commonplace at the website. Comparing the website map with log files can help determine the amount of effort required of users. On the other hand, one can see that the average number of hyperlinks for individual Stat-USA webpages is a very spare four. Both NARA and NIH are nearly four times as hyperlinked. As will be discussed more fully in the situated proxies Findings section, the users noted that the Stat-USA website seemed to be an HTML "shell" overlaying database files. Here we have possible verification of the users' perceptions, thus reinforcing the validity of the combined methods. The matter may be analyzed further by reference to a WebMapper reporting function that maps links to pages (not shown on the summary tables).

Because so many of Stat-USA's clients download data directly into Excel, or other applications, the presence of HTML tags can reduces the usability of the data by acting as contaminants. Here is a situation where the developers' and proxies' perceptions differed. Stat-USA addressed the difference by suggesting that their website subscribers were quite different from the student proxies used for the situated assessments. This may be quite true. It demonstrates the caution with which assessors should proceed. Log file analysis can help to provide a stakeholder profile of present users. If an aim of the website is to increase use (as is the case with Stat-USA), the caution points in both directions: It could very well be the

case that situated proxies' assessments can show the way to new users. Finally, the Map Statistics report describes which Web server software the site is running, as well as which HTTP version.

Table 5: Map Statistics

	Stat-USA	NARA	NIH
		Map Statistics	
Levels	6	4	4
Avg. Links/Pg.	4	15	14
		Server Summary	
Domain	www.stat-usa.gov	www.nara.gov	www.nih.gov
Server Version	Netscape-Commerce/1.2	Netscape-Commerce/1.1	Apache/1.1.1
HTTP Version	1.0	1.0	1.0

Table 6 below presents a more detailed picture of the websites. WebMapper refers to individual pages, images, gateways, audio or video files, Mailto, applications or other website resources as "objects." From Table 5 one can see Stat-USA is by far the largest of the three websites, containing 912 objects total, of which 420 are webpages. The storage capacity required for the website itself exceeds 34 megabytes. Also, the Stat-USA site far outdistances NARA and NIH in the number of applications running on its server, with 66 total, compared to 2 for NARA and none for NIH. It is also easy to see that despite having a total memory requirement of less than 300 kilobytes, NARA has substantially more images loaded on its website as either of the others. Even that is not especially graphics intensive for a website with 261 pages (the graphics files -- 84 -- are counted separately from pages). NARA and NIH are quite similar in size and depth, as well as in the type and number of gateways, and applications running or not present on their sites. That Stat-USA with a far larger site has so many fewer graphics highlights the intensive database nature of the Commerce website. The applications objects for Stat-USA account for 30 of its 34 megabytes. The fact that WebMapper indicates two applications running on the NARA website, but allots no size for them is anomalous.

Table 6: Object Statistics

	Stat-USA		NARA		NIH	
Type	**Count**	**Size**	**Count**	**Size**	**Count**	**Size**
Pages	420	515621	261	145219	251	509297
Images	17	171392	84	150407	50	38359
Gateways	7	N/A	2	N/A	3	N/A
Internet	6	N/A	37	N/A	27	N/A
Java	0	0	0	0	0	0
Applications	66	30263301	2	0	0	0
Audio	0	0	0	0	0	0
Video	0	0	0	0	0	0
Text	48	821424	5	0	0	0
Other media	348	2952656	0	0	1	0
Total	912	34724394	391	295626	332	547656

WebMapper generated a Status Summary (Table 7) which depicts hyperlink data. Taking Stat-USA as the first example, note that of the 876 onsite objects (pages, images, applications, *etc.*), 413 errors resulted. Such a high error rate may have a plausible explanation, but further investigation would be necessary to determine the reason. Several situations are possible, but the researchers lack error log files for Stat-USA and so cannot pinpoint the exact cause(s) of the high error count. The same report for NARA and NIH returned no errors. Stat-USA also returned 20 Not Found 404 errors. Clearly these are defunct hyperlinks. A more detailed report provides URLs for each of these so that the website administrator could remedy these errors easily.

Table 7: Status Summary

	Stat-USA		NARA		NIH	
	Objects	Links	Objects	Links	Objects	Links
Onsite	876	1511	299	461	220	491
OK	443	780	48	178	59	289
Not Found (404)	20	20	0	0	0	0
Other Errors	413	711	0	0	0	0
Unverified	0	0	251	283	161	202
Offsite	36	57	92	128	112	173
OK	28	45	4	7	8	23
Not Found (404)	0	0	0	0	1	1
Other Errors	2	3	0	0	0	0
Unverified	6	9	88	121	103	149
Totals	912	1568	391	589	332	664

The bottom portion of Table 7 shows offsite links incorporated into the websites, meaning objects at different locations (domains) than its parent page. Given that the Web mappings described above all began at the websites' homepages, the offsite links truly are indicators of websites external to Stat-USA, NARA, or NIH. For example, the National Cancer Institute is one website nested within a complex of National Institutes of Health websites (with Public Health Administration above them, and the Department of Health above them all). Therefore most of the offsite hyperlinks are in fact crosslinks to other federal health agencies' websites and online services.

When WebMapper explores a website, it acts as a robot, or spider. It is the prerogative of the website being "x-rayed" by WebMapper to decline the privilege. One of WebMapper's default settings is to honor "robot exclusion protocols." Spider activity is rising rapidly across the Web, becoming one of the major forms of traffic and website visitations. When conducting log analysis website administrators should be cognizant of the likelihood that a portion of traffic through their sites are automated crawlers. Interestingly, despite the fact that Stat-USA is passworded due to its subscription nature, WebMapper had no problem mapping all pages within the website, passworded or not. The WebMapper application does not, however, retrieve the content of web pages, and so the security of Stat-USA was never breached. It is conceivable, by the same token, that some websites might hyperlink to sensitive data. Website administrators should be aware that present website administration technology such as WebMapper can provide a detailed structural view of any website that does not block Web spiders. It is quite possible that the inability of WebMapper to provide a structural overview of the large Census website was due to security features of that site.

Web Server Log File Analysis

By arrangement with Stat-USA, the study team used file transfer protocol to retrieve a 33 megabyte log file from a Stat-USA server. Although the researchers expected a complete set of log files, they made do with a sample from the access_log. The access_log covered a period of Stat-USA website use from January 13, 1997 at 9:20 a.m. until January 21, 1997 at 10:07 a.m. (a little more then 8 days). To represent analysis for a one-week unit, the team removed the last (eighth) day from the access_log. With the file on a local server, a team member ran customized PERL scripts against the access_log. The processing

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required about twenty minutes (the server used to analyze this data was a Pentium 150 MHz computer, 32 MB of RAM, running on a shared Ethernet network, with a T3 backbone). The PERL scripts generated nearly 20 HTML pages, the data from which was imported into Microsoft Excel for analysis. The combined Stat-USA access_log and HTML pages took up about 40 MB of storage space. The analysis shown below is only a fraction of what is possible to do with statistical tracking. Indications are made where further analysis and testing are required to approximate 100% accurate results.

The Access_log

Access_logs track information such as a computer's Internet Protocol (IP) address (or domain name), which pages a user accessed, and at what times. It is possible to tell how long a user visited a site and what path the user took through a site. One limitation on log analysis emerges when a uses hits the "Back" button on the browser to retrace steps. Access_logs do not capture this action very effectively, and thus the trail through a website is formed by clicking on hyperlinks. Access_logs are good at revealing:

- Number of hits vs. number of accesses
- Number of United States hits vs. outside countries
- Path analysis of specific users.

The researchers first compared the number of hits to the number of accesses. After running the analysis and studying the results, it was clear that a majority of the Stat-USA's accesses are database queries. However, the PERL scripts as written were in too simplistic a format and did not record database queries as accesses. Rather than rewrite all the PERL script, a team member wrote a short shell script capable of analyzing the access_log to provide a more accurate count of the number of accesses.

Some basic definitions:

Hit - A hit is any file from a website which a user downloads. A hit can be a text document, image, movie, or a sound file. Say a user downloads a webpage that has six images on it, then that user hit the Web site seven times (6 images +1 text page).

Access - An access, sometimes called a "page hit", is an entire page downloaded by a user regardless of the number of images, sounds, or movies. Even if a user downloads a webpage that has six images on it, that user accessed only one page of the website.

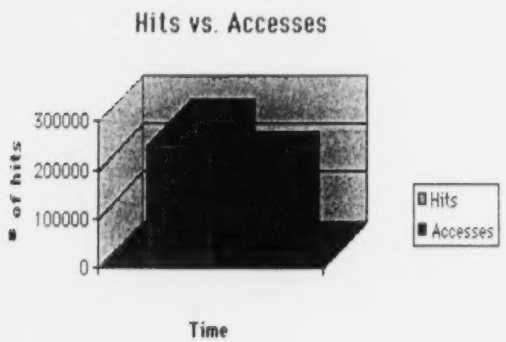
Analysis of Stat-USA Access Log

Comparative path analysis of specific users considered the following variables:

- Number of hits vs. number of accesses
- Number of United States hits vs. outside countries
- Path analysis of specific users

Several analytical uses can be made of the path (thread) a user navigates through a website, such as clock analysis, entry page, exit page, and more as described above. The table below represents a small sample of actual IP addresses or domain names that "hit" the Stat-USA server over the week of January 13 - 19, 1997. The table columns display the page at which users entered the Stat-USA site, what pages they saw while on the site, and finally the page from which they exited the site. At the bottom of the analysis is the time that each user spent on the Stat-USA site. Following that is a list of a few randomly picked users selected for path analysis.

Figure 4: Webpage "Hits" versus Webserver Accesses



	Hits	Accesses
Week One	250,254	183,055

Situated Proxies Assessment

The ten situated assessments took place three sets of sessions, held at the users' convenience. Three assessors looked at Stat-USA, three at the NARA site, and two apiece for NIH and Census. The sessions all went smoothly, and varied from about 40 minutes to an hour, depending on the user's interest. On occasion, a researcher would intervene for one or another reason. These reasons ranged from asking the assessor to speak more loudly, or more specifically, to helping to attribute a slow download to either

the website or a Syracuse University server. In one instance, an assessor began criticizing the website's choice of fonts. A study team member pointed out that font type and size could be altered in the Netscape browser preferences, and therefore might not be a issue generated by the website. Several times the situation arose that the assessor might spend a large amount of time evaluating the websites' search engine performance. While a perfectly valid thing to assess, website search engine effectiveness represented a minor portion of the evaluative criteria. If an assessor seemed to be spending a large amount of time analyzing searches, the researchers reminded them about the criteria categories pasted to the top of the monitor. Otherwise, the researchers said as little as they could and stood by to observe the searches and take notes. Some of the observations the researchers made of the assessors are:

- All but two of the ten assessors rated their navigation and searching skills at four on a scale of five. The exceptions included a "three" and a "five." However, during the assessment sessions the proxies clearly displayed more variance than indicated by their self ratings. The question about skill rating for the sample therefore failed to discern satisfactorily between users. The issue of skill itself however, is key. The more sophisticated a user was at conventional online searching (Boolean queries and judging relevance of the recall) the more adept they seemed at moving beyond assessment of the search engine, and at distinguishing between browser preferences (settings) and website features. The study did not set out to delineate assessments according to user experience levels, but the data suggest that such a dimension may be important in analyzing user feedback, or more specifically, user assessments. The authors do not suggest that one category of user experience is preferable to another. Rather, that experience may play a role in what aspect(s) of assessment various users concentrate their primary efforts.

- Most users were unable to distinguish between the features of the browser (Netscape) they were using and properties of the website, or of the possible mediation of the local (Syracuse University) server. This could result in unfair assignment of blame to the website. As in so many situations involving the Web, it is quite possible that the novelty and mercurial state of Web technology, and especially browsers at the present time, may defy a common understanding between users. In other words, the users' general lack of recognition between browser and server characteristics may well be an historical effect. If a common browser interface emerges it could develop that familiarity with the technology is less important to assessments. At the present time, technology is still very much in the foreground. It can be difficult to separate technology effects from information presentation.

- Users' searches (situated information needs) were often simplistic, or at best, highly general. Because of this, any retrievals tended to be seen as a successful search. In one instance, a proxy found a satisfactory answer to his question within a minute of beginning his session. This is an indicator of success by almost any measure, and reflects credit on the website searched (Stat-USA). By the same token, it highlights a significant finding of the situated assessments: Presentation of information is most noticed when it interferes with a search. Most proxies focused on getting past the presentation of information to the information itself. This should not be surprising, except it could suggest that cosmetic elements of a website are irrelevant unless they directly contribute to the access of information. Suffice it to say that this is contrary to the majority of commercial website marketing approaches.

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- Users seemed quick to accept the trustworthiness of information they retrieved from federal websites. Whether a function of low expectations or high precision of items retrieved, the proxies seldom questioned the reliability of their results. A follow-up (not done) might be illuminating. Although the proxies brought questions to address with them to their assessment sessions, in only a few instances did assessors bookmark or otherwise preserve information about their searches (even when deemed successful). This suggests to the researchers that most of the proxies did not intend to use their search results after the assessments (an assumption that may be unfounded -- several proxies did indicate that they found the website interesting enough to return to later). Further comparisons of situated proxies with more naturalistic user samples could help clarify whether the situated proxies *focused on answering their questions as a component of performing an assessment* as opposed to assessing the website in the context of successfully addressing an information need.

The situated proxies assessed their respective federal website on a five-point Likert scale with "1" representing a low negative reaction, and "5" high positive (See Appendix 2G-H for criteria). Table 8 presents results of the situated assessments. Ratings varied both by individual and by site. Usually, there was fairly high agreement between assessors looking at the same website. In a few cases, however, this was not the case. The mean overall ratings of the four websites were: NARA - 2.5, Census - 3.7, NIH - 3.6 and Stat-USA - 3.1. The ratings within each assessment category -- Quality, Usefulness, Presentation, Navigation and General -- are consistent with the overall site ratings. Agreement between assessors was lowest in the Quality and Presentation variables, which recommends more attention be given to these categories. We hasten to note that the study was not designed to produce an authoritative coefficient of website, but rather a range of criteria that can provide the federal Web administrator guidelines. Many interpretations can be given for the figures listed above, and particularly since the websites are quite different from one another taking the values as fixed can be misleading. Having said all that, they can neither be summarily dismissed as irrelevant to user satisfaction.

Comments made by situated users for each website include the following, first for NARA:

- Major problem: Search engine not well marked. It is called NARA Information Locator (NAIL), and even then not clearly identified as a search engine. It was very difficult to locate.
- The NAIL Search engine seems to retrieve a small amount of information considering what is available in paper format. This does not foster trust in the website.
- Site severed connection on one user, although why was unclear.
- The information is well-formatted.
- Downloads are fairly quick.

Summary: The NARA website has good information that is attractively presented, but the search engine is an Achilles' Heel.

The Census website received the most favorable review by the users. Because the researchers could not survey the Census website with WebMapper, the structure of the site is relatively unknown. It is a very large and complex site. The situated proxies said about the Census site:

- Site holds good information.
- It stimulates browsing.
- Its content is attractively presented.
- There are some formatting inconsistencies.
- Some links suddenly take user offsite.
- The User Manual is poor.

Summary: Census was the best-received of the four sites. Users managed to get information from searches and menu options fairly efficiently. There were some problems with consistency of appearance and currency of links.

The National Institutes of Health website also impressed users, for the most part. Specifically, the assessors said:

- Easy searchability.
- It is well-laid out.
- The menus are useful.
- The search engine provided no explanation of its retrieval ranking system.
- The graphics did not assist much in navigation.
- In at least one case, a search returned as discrete hits three different parts of a single document. This was not clear until looking at the text of each hit (and there were only six total).

Table 8: Situated Assessor Profiles

ASSESSORS													
(# of)	2			2			3				3			
Age	23	22		25	30		23	47	36		22	31	29	27.3
Major	MLS	MLS		MLS	MLS		TNM	MLS	TNM		TNM	MLS	MLS	
Webpages designed	0	0		1	6		6	0	4		2	0	1	1
Navigating experience (months)	24	36		4	15		36	18	30		36	36	24	3.2
Navigating skill (1-5)	4	4	4.0	3	4	3.5	4	4	4	4.0	5	5	4	4.7
Experience using federal information	3	2	2.5	4	4	4	1	3	4	2.6	2	4	2	2.7
Evaluating design	3	3	3	3	4	3.5	2	3	3	2.6	4	4	3	3.7
Evaluating conten	4	3	3.5	3	4	3.5	2	3	3	2.6	4	4	2	3.3

Table 9: Situated Assessment Data Summary

	NARA			CENSUS			NIH				STAT-USA			
Criteria	a	b	ttl	a	b	ttl	a	b	c	ttl	a	b	c	ttl
QUALITY														
1	4	4	4	4	4	4	3	3	3	3	3	4	3	3.3
2	2	4	3	3	4	3.5	4	4	2	3.3	4	5	1	3.3
3	2	4	3	2	5	3.5	5	4	2	3.6	4	5	4	4.3
4	2	3	2.5	4	3	3.5	4	4	4	4	4	3	1	2.7
5	2	4	3	4	3	3.5	4	3	3	3.3	4	3	1	2.7
6	4	4	4	4	4	4	4	5	4	4.3	3	4	3	3.3
7	4	3	3.5	2	3	2.5	4	3	3	3.3	2	4	3	3
			3.3			3.5				3.5				3.2
USEFULNESS														
1	1	2	1.5	5	4	4.5	2	3	2	2.3	4	5	3	4
2	4	1	2.5	2	3	2.5	2	4	1	2.3	4	2	1	2.3
3	1	2	1.5	4	3	3.5	3	5	4	4	3	2	1	2
4	2	2	2	5	3	4	2	3	4	3	3	3	2	2.7
5	2	2	2	4	4	4	3	3	4	3.3	4	4	1	3
6	2	3	2.5	1	4	2.5	4	4	2	3.3	4	5	1	3.3
7	2	3	2.5	4	4	4	3	4	4	3.6	4	5	3	4
8	3	2	2.5	5	4	4.5	5	5	4	4.6	5	4	1	3.3
			2.1			3.7				3.3				3.0
PRESENTATION														
1	3	4	3.5	4	4	4	4	3	5	4	4	3	3	3.3
2	3	4	3.5	3	3	3	4	3	4	3.6	4	2	2	2.7
3	2	4	3	4	3	3.5	4	4	4	4	4	3	2	3
4	1	4	2.5	5	4	4.5	1	4	4	3	3	4	5	4
5	2	2	2	5	4	4.5	3	3	4	3.3	3	4	4	3.7
6	4	4	3	2	3	2.5	3	1	1	1.6	3	1	3	2.3
			2.9			3.7				3.9				3.2
NAVIGATION														
1	2	1	1.5	5	4	4.5	2	1	4	2.3	4	3	2	3
2	2	2	2	4	4	4	4	5	4	4.3	3	2	4	3
3	2	2	2	4	4	4	4	3	4	3.6	4	3	3	3.3
4	2	1	1.5	3	3	3	5	3	3	3.6	4	4	1	3
			1.8			3.9				3.5				3.1
GENERAL														
1	3	3	3	5	3	4	5	4	4	4.3	5	3	1	3
2	2	1	1.5	4	3	3.5	4	4	4	4	4	3	1	2.7
3	1	2	1.5	5	2	3.5	4	3	4	3.6	4	2	1	2.3
4	3	4	3.5	5	4	4.5	3	1	5	3	4	4	3	3.7
			2.4			3.9				3.7				2.9
MEAN TOTAL			2.5			3.7				3.6				3.1

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Stat-USA suffered from three primary problems:

- Content is not novice friendly.
- Inconsistent format (color changes, screen space wasted, columns not marked or flush, and more)
- The Web aspect amounts to a thin shell. Data below the first layer appears to have been dumped in without links or careful formatting.

Some frequent themes, both positive and negative, emerged from the situated assessments. Listed below are findings common to all or most website assessments and related to the Ease of Use and Content categories.

Positive Findings:

- Information on websites was substantial, useful, and perceived to be of fairly high quality.
- Presentation of information on websites met an aesthetically pleasing standard.
- Information returned from search queries generally proved satisfactory to information needs.
- Layout of information, placement of banners and use of hyperlinks were generally consistent throughout each individual website.

Negative Findings:

- In some instances, proxies had difficulty locating a search engine because of poor labeling or placement.
- Help sections could be cumbersome. Too often they lacked clear and concise organization.
- When hyperlinks took users to external websites, a problem often was lack of navigational tools on imported pages.
- In several cases, the user's ability to give feedback was either non-existent or limited.

The ability to substantiate such important and informative information about a website communicates the effectiveness and usefulness of the situated assessments technique as a qualitatively valuable tool for federal agencies in developing and improving their websites.

Focus Group

One week after the conclusion of the situated assessments all but one of the proxies met with four members of the study team to discuss impressions of the assessments, the methods involved, and suggestions for further research. The focus group lasted one hour and twenty minutes. Responses to probes submitted by the researchers to the proxies follow.

What constitutes good navigability? Members of the focus group felt that this was difficult to describe because the parameters are not clearly understood. They said that one could always learn more about how to navigate the Web and the more time one spent at a site the better one becomes at navigating through it. One proxy maintained that good navigability was the efficiency at locating what one went to the site to find. Another suggested that a user of the Web has prior expectations of what they expect to find which can affect navigability. A couple of participants felt that their Web experience is above average and that the average user would have had more difficulty navigating the sites they looked at.

How legitimate is the information on federal websites? Most participants felt that they did not have enough time to develop an opinion about information on the site they evaluated. Furthermore, it is interesting to note that participants generally felt, because they were at a government site the question of legitimate information was moot. In the case of STAT-USA however, proxies expressed frustration with the site's lack of clear citations about sources of the statistical data. Even though most participants felt that it was difficult to judge the information because it being a government site, more than half (six people) stated that if this exercise was in a real world context they would have left the site to fulfill their information need elsewhere.

Searching skills outside the Web environment. Many focus group members believed that their searching skills outside the Web were adequate, but were unsure of how the search engines on a site operated (Boolean, Natural Language, *etc.*) which effected their results in locating information. Many participants also complained that existing search engine help screens were unsuccessful in describing the search engine operation, and in the case of STAT-USA did not even deal specifically with that site. Limited time was also an element which participants said affected their searching results and overall evaluation of the site. Being able to simply locate the search engine was a problem for the National Archives and Records Administration site. Both individuals who evaluated this site commented on the difficulty they had in locating the search engine because of the peculiar way it was labeled ("NAIL").

Are the methods used helpful to federal agencies? All focus group members agreed that the assessment methods used could help agencies improve their websites. One participant ventured that many agencies have been focusing only on creating a website without thinking about how the information on the

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site might be used. Another participant stated that many agencies lack incentive to improve their sites, but that such incentives might be achieved through the situated assessment methods. The situated user approach can further benefit an agency by offering critical feedback about their site's overall presentation and organization. By listening to users an agency may be able to gain insight about other potential users (and uses) of their site which could in turn, help them in developing and maintaining the site. Only two of the nine participants said that the site they visited fully matched their expectations. This position seems to contrast with the majority of proxies' stated satisfaction with their search results and confidence in the information retrieved.

Are criteria transferable to other websites? Participants unanimously concurred that the criteria could be applied to practically any website. Every website faces issues of presentation, navigation, quality, and usefulness. Participants further noted that for every site there is a target audience and knowing your target audience can improve the site development as well as support the evaluation of a website.

Was the sample appropriate? No one expressed any reservations about the use of situated proxies, or about the mixture of experience levels in the assessor sample. On the contrary, the group agreed that the utilization of Web-experienced individuals provided a valid test group. A few focus group members thought that it should be possible to learn even more from the situated assessments by contrasting experiences of novice users with experienced Webmasters.

Findings

Findings from both the situated assessments and subsequent focus group offer insight into the usefulness of these techniques in evaluating federal websites. Some specific findings include:

- Proxies more familiar with Web browsers better identify the most likely sources of data transmission problems, and are not reluctant to attribute delays to the website they are evaluating.
- It is important to carefully distinguish between proxies' hypertext navigation skills and more traditional (*e.g.*, Boolean) searching skills. Hypertext searching is typically point-and-click navigation, which may differ markedly from using a search engine. The present study did not set out to evaluate the selected websites' search engines, yet often those were often aspects of the sites on which many users focused heavily.
- All proxies agreed that time allocated for the search session (45 minutes) was insufficient to form a thorough opinion about the quality / reliability of information found on the website.
- Proxies' Web experience and familiarity with the type of content available on the website aided their ability to evaluate results of their searches.

- All proxies agreed that the current assessment methods is a useful technique for federal agencies to use to evaluate their websites.
- Proxies agreed that not only is this method useful to federal agencies, but it could probably be extended to other types of websites.

These findings underscore the usefulness of the situated assessment as a valuable tool in assessing websites, and offer substantial recommendations for the improvement of the technique overall.

User-Based Guidelines

Web users risk giving too much faith to the powerful new medium. They receive information from a search, so they may feel relatively satisfied. Often they seem not to take the additional step of evaluating the quality of the information obtained. Perhaps a special case of separating technology from information presentation is separating information presentation (and presence) from information quality. Is technological transparency resulting in information opacity? One of the incentives for conducting this study is the researchers' awareness that a tremendous amount of "information" is being loaded very rapidly onto the Web. A less sanguine view might say we are participant-observers of a "data dump" of epic proportions. Information availability can be subsumed by information obliteration. The rise of websites as public information dissemination vehicles reinforces a need to develop quality criteria for assessing federal information and services available from federal websites. The best way to ensure that the utilitarian agenda of universal access is met, is to bring users directly into the design and maintenance processes of systems development.

Powerful organizational and technological processes are converging to produce information technologies that will play crucial roles in providing, or limiting access to public information. By providing ongoing user feedback to those responsible for the development of government information systems, more robust systems may result. User assessments can warn systems developers of problems before they become inextricably embedded. Similarly, user assessments can help to ensure that information systems are driven by user needs rather than user needs being determined by technological and organizational imperatives.

Technical Assessments

One of the principle goals of this project was to develop technical and policy assessment instruments that could easily be employed by federal agencies to evaluate the quality of their websites. Unlike the "situated" assessment process, which attempts to ascertain user perceptions regarding content quality, organization, usefulness, and overall ease-of-use, the technical and policy assessments were intended to ascertain in a more objective manner, the site's compliance with accepted technical criteria associated with high-quality websites and policy criteria relevant to federal websites.

One member of the study team pretested the Technical and Policy Assessment criteria and protocols (See Appendix 3) . The reviewer accessed approximately 25 pages at each of the four sites, conducted at least one search, and visited several help pages. The reviewer supplemented the structured responses to the assessment criteria with marginalia. The researcher discovered difficulties with both instruments. The problems were most evident with the Technical Assessment which the researchers had expected to be fairly straightforward, but similar difficulties arose during the Policy Assessment. In order to verify these preliminary results, two other members of the study team repeated the assessments with similar outcomes.

After meeting to revise the Technical and Policy Assessment procedures, two study team members reassessed each website with the new instruments (Appendix 3). In both the pretest and the subsequent evaluations, reviewers assessed each site for approximately one hour, over a minimum of five pages per site. The pages selected for review came from major links available on the websites' homepages. Although adjustments to the procedure yielded somewhat improved results, at the conclusion of this study there are still issues to be addressed in developing effective assessment instruments that attempt to assess complex websites by sampling pages rather than comprehensively reviewing the entire site. Even a comprehensive assessment would pose problems of decontextualization. The following sections provide details of the difficulties encountered in the Technical and Policy Assessments.

Findings

Appendices 3A-D display the results of the technical assessments. As will be discussed in the Issues and Recommendations section, the reviewers were unable, in many instances, to complete the assess-

ment instrument. The completed technical assessment forms (Appendices 3A-D) include many question marks reflecting problems in drawing yes/no conclusions about a site's features. Due to a large degree of complexity within the websites considered by this study, to make fair and accurate assessments many criteria have to be answered differently according to the particular page. One finding of this study is that consistency within a website is a very difficult variable to measure. Websites typically include hyperlinks to external sites which take the user into radically different environments than the host site, and, within any single site the informational context may vary significantly requiring different measurement yardsticks, or at the very least, individual treatment. A key difficulty with the technical assessment approach used in this study was the attempt to assess websites at a holistic level, when they are frequently highly variegated aggregates. Having made this point however, the criteria themselves seemed to handle individual webpages well. The levels of analysis issue must be addressed in any future assessment effort.

Despite these limitations, each of the examined sites met most of the identified criteria. Due the heterogeneity of websites, the researchers found assessment of the following areas to be especially problematic:

- consistency of banner design and placement, and informative link headings/descriptions
- availability and consistency of navigation buttons (return to homepage)
- functionality of navigation bars
- availability of downloading options and information about file sizes
- consistent distinctions between graphics and graphical lengths
- anchors in lengthy documents or breaking them to ensure they did not exceed three screen lengths.

The sites did not generally do a good job of ensuring that users could remain oriented within the sites and providing fully functional navigation aides.

Recognizing the limitation of applying many of the technical criteria to the website as a whole, the other two reviewers both selected five pages at each site and assessed those pages independently. Their results validated the initial assessor's. To remedy the methodological problems with this aspect of the assessment either a comprehensive assessment of entire websites is necessary (which may be impractical in

many cases), or a very sophisticated sampling technique with assessment criteria typologized according to the characteristics and intended uses of the retrieved webpages is required.

Policy Assessment

Appendix 3C summarizes assessments by three reviewers. All of the federal websites assessed largely complied with existing information policies. The content and services included on these sites were consistent with agency missions and functions. With possibly one exception, the sites examined did not appear to advocate political positions. The possible exception -- the Tiger Mapping Service at the Census Bureau site -- did not explicitly advocate a political position but warns that the service may be discontinued due to funding limitations. This might be interpreted as lobbying, but could also be defended as fair warning to users. The external links to commercial sites included on these sites appeared consistent with the site's intended use.

With the exception of the NIH site, these sites provided visitors to their sites a means of contacting Web administrators, and in some instances the actual content providers. For the most part, site visitors are able to assess the currency of the posted information. None of the websites appeared to be engaged in data collection.

The criterion on the policy instrument: "Are the location aids GILS compliant?" requires better definition. Reviewers found it hard to interpret as stated. Members of the research team participated in a recent evaluation of the Government Information Locator Service implementation and are positioned to revise the GILS criterion for website assessment purposes.[7] Depending on the outcomes of the evaluation, a core set of criteria may be developed which target specific aspects of federal information dissemination through websites. Central to formulating a set of GILS core criteria to be applied to websites are two related questions. First, what constitutes an official record in a website environment? This question is being researched by McClure, *et. al.*, under a contract from the U.S. National Historical Publications and Records Commission (McClure and Sprehe, 1996). Mirroring that issue is the problem of characterizing Web envi-

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[7] *An Evaluation of the Federal Government's Implementation of the Government Information Locator Service (GILS).* (Sept. 26, 1996). W.E. Moen and C.R. McClure. *Work Plan* submitted to the General Services Administration, Office of Information Technology Integration, Washington, D.C. Contract no. GS00K96APC2368. *Final Report* pending, Spring 1997.

ronments under any accurate and general definition. Websites are both diverse and dynamic. And that within a single site. When surveying the conceptual geography of federal websites, a shifting, composite picture emerges. GILS has potential utility for identifying at least a minimum set of features every official information dissemination vehicle should have. Perhaps the convergence of the two questions just described will occur if and when federal agencies begin trying to characterize their websites according to the GILS profile and core elements. This is an area that may hold prospects for further research.

Findings

The reviewers found the sites generally in compliance with federal policies and with technical guidelines associated with high quality websites. The reviewers did note some variation in the level of technical sophistication and policy compliance from one website to another, and the potential for improvements exists at them all. The reviewers report some problems with the design of the assessment instruments and evaluation procedures. The Issues and Recommendations section discusses how the Technical and Policy assessment processes can be improved.

Site Visit

Members of the study team visited Stat-USA in its offices at the Department of Commerce, in Washington, D.C., on February 21, 1997. The visit lasted most of a day and consisted of several interviews followed by a focus group, attended by four researchers and five Stat-USA staff. Topics ranged from organizational alignments to technology requirements, and from user/client issues to technical expertise required of staff. See Appendix 4A for probes presented to Stat-USA during the site visit. During the midpoint of the focus group the researchers showed an 11-minute videotape of situated users assessing the Stat-USA website.

Stat-USA Internet staff described the Web-based operation as "the federal government's premier electronic publisher of trade and economic information."[8] Stat-USA is unusual in that it provides subscription access to its databases which in turn, funds staff salaries and pays for overhead and equipment costs. The relative autonomy from its parent organization (the Department of Commerce) allows this small

[8] From a promotional brochure produced by Stat-USA. No title. #12/96-10k.

(fewer than 30 employees) operation's website to be highly flexible, and according to its administrators, highly responsive to its clientele. Stat-USA operates as a small business, including a philosophy of providing value added products to its customers. Stat-USA claims authority for following a business model from Vice-President Al Gore's National Performance Review (1994). The website's chief administrator calls the site "an experiment" which is successful only so long as it manages to "break even" on recovering costs. Although the Stat-USA site is in many respects rich and challenging to assess, it is nevertheless atypical of other federal websites. For this reason, some data collected during the course of the site visit are not generalizable to other federal sites. The researchers have elected to limit analysis and to report findings to areas that may be compared to the other selected federal websites.

Findings

Below are observations from an interview which pertained to Stat-USA user charges and websites finances. The participants were the two most senior members of Stat-USA, and three members of the Syracuse University research team.

- Website users are largely high-end, or corporate and other government agencies.
- Promotional activities are ongoing to expand user base.
- The website aims to "break even." During its first year of operation it lost over $200,000, but it recovered costs its second year.
- If subscriptions exceed costs in any given year, the funds will be used to upgrade facilities, equipment, staff and services.
- The Stat-USA website operates as a "small business" along lines suggested by the 1994 National Performance Review. The administrators observed that the Stat-USA website is an organizational experiment that may become more common over the next few years.
- At the time of the study, Stat-USA had not systematically assessed its website from a user perspective.
- Stat-USA website administrators did not regard a lack of policy guidance from OMB, NARA or other information management agencies to be a problem. On the contrary, they maintained that a looser policy environment allows a flexibility well-matched to the dynamism of the current Web, and best suited to meeting client needs.
- While Stat-USA staff said they found the videotaped remarks made by situated assessors to be enlightening, but voiced skepticism whether the substance of the proxies' concerns would accurately reflect those of actual users (subscribers) of the website.
- Stat-USA has already revamped much of its website into a LotusNotes format that appears to improve on several areas criticized by situated users.

Stat-USA's unusual (at least in the federal government) financial and organizational structures allow it to succeed at delivering information products. Whether the model being pioneered by Stat-USA is transferable to other websites is an open question. More study is required to examine costing issues of federal websites providing fee-based services.

During the site visit it became clear that one of the intended data collection activities -- online popups -- would be difficult to arrange. The website administrators felt that such an event interrupting the site users' sessions would be too intrusive, and distract users from their primary purposes. The Web administrators maintained that most subscribers to the site were familiar with the website and knew how efficiently to obtain what they wanted. Popups would defeat the assessment purpose by drawing negative commentary to their own presence, rather than to the website itself, but the negative effect would accrue to the website by association.

The discussion of popups highlighted an intriguing and related situation with the Stat-USA website. The Stat-USA administrators believed, as already stated, that they knew who their users are, as indeed a subscription service would, and that informal means of feedback served the site well. When asked whether they relied on email to obtain feedback they said they did not. Email feedback would come from the email address (hyperlinked) which appears on the bottom of nearly every page of the website. The user could click on the link to bring up an email form that seemed addressed to the Webmaster. However, everyone at Stat-USA agreed that based on their past experience with this communication channel, they received more noise than message, and so presently do not seriously consider email to be useful for feedback. Since casual browsing is not relevant to the website, given its subscriber base and business nature, it may well be that the informal network and the telephone are more powerful means than email for gaining audience response to this site.

Dissemination of Findings

The principal investigators were invited to present their findings to a consortium of high-level government executives interested in the emerging prominence of the Web in federal information management and dissemination. As part of both the dissemination effort and verification of the study's findings, a

member of the study team presented an overview of the evaluation techniques developed in the study and findings to federal officials at two meetings in Washington D.C. in April 1997. About 75 individuals, in total attended these two meetings. Most had responsibilities for web administration at their agency, although others included agency heads, systems administrators, and records managers.

The presentations stressed the overall importance of federal websites evaluation, and networked information resources and services in general. Beyond a discussion of evaluation basics the presentations included specific explanations of:

- the online situated user assessment
- Web server log analysis techniques
- the use of focus groups in the study.

During breaks and informally, additional discussion occurred regarding webmapping and use of video taping in the situated online user assessment.

Participants were very interested in these assessment techniques and asked probing, knowledgeable questions about the evaluation techniques and how best to use them in their particular settings. The various log analysis techniques incurred a great deal of interest -- especially in their potential for cross-log analysis techniques. Additional discussion of privacy issues and the possibility that agency log files could be accessed through the Freedom of Information Act process generated considerable interest.

The federal attendees expressed keen interest in the researchers' various evaluation techniques and described their need for "turn key" approaches that are, as one individual described them "quick and clean." They especially encouraged that all additional work in the area of evaluation be reported and were interested in obtaining final reports of both this project and similar work recently done on the Government Information Locator Service (GILS),[9] which also developed interesting applications for web assessments.

Conference participants also noted that the development of evaluation tools such as those reported at these sessions could provide an effective means for them to meet the requirements of the *Government Performance Results Act* (GPRA) of 1993. The GPRA requires agencies to develop goals and performance

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[9] *An Evaluation of the Federal Government's Implementation of the Government Information Locator Service (GILS)*. 2 vols. W.E. Moen & C. R. McClure. Denton, TX: University of North Texas, School of Library and Information Sciences, 1997. (Forthcoming in ERIC Clearinghouse).

indicators for key services and activities -- such as Web-based services. Indeed, participants generally agreed with study team findings pointing out the lack of policy guidelines for federal web management and electronic records management in the federal web environment.

The responses from the agency individuals attending these sessions were extremely positive. Further, their comments and suggestions for future research verified the importance of developing evaluation techniques for web-based services. While they were pleased with the work done to date, their comments also informed the study team's perceptions of areas where additional research should be considered in the broad topic of evaluation of web-based services and resources (discussed in Chapter 5). Clearly, the work reported in this study was of key interest to these participants.

In addition to the study techniques and findings presented at the two federal forums in April, the study team has taken other dissemination actions. To date these include a detailed treatment of the policy context of the assessment of federal websites published in the Spring 1997 issue of *Government Information Quarterly* (Eschenfelder, *et. al.*). A draft of preliminary findings was accepted for inclusion on the program (and in the *Proceedings*) of the American Society for Information Scientists Annual Conference, to be held in Washington, D.C., from November 01-05, 1997 (see Wyman, McClure, Beachboard and Eschenfelder, 1997). Additional dissemination activities will be performed as appropriate. One of these will be making available the *Final Report* through the ERIC Clearinghouse at Syracuse University.

Chapter 5. Issues and Recommendations

This study developed and evaluated system-, user-, design- (policy and technical), and developer-based criteria for evaluating federal websites through a variety of assessment methods. The previous sections described the methods and findings resulting from application of a multimethod approach. The assessments identified several issues that should prove useful for federal officials charged with developing or evaluating Web-based information dissemination services.

Objective Questions

In contrast to the user-based situated assessments, the study team intended the technical assessments to be as objective as possible. The majority of the assessment questions were framed simple yes or no responses. For example, "Is a text only version of this site available?", or "Does the site consistently differentiate between graphics and graphical links?" Despite the researchers expectations, some questions proved to be relatively subjective; for example, "Do hotlink headings and descriptions match the information found through the hotlinks?" or "Are banners consistently designed?" Facts cannot speak for themselves. All criteria need to be interpreted so it is not possible to escape exercising some degree of subjectivity. The technical criteria, without detailed operationalized definitions, can produce incommensurable interpretations between raters resulting in reliability problems. The study team was unable to complete the multiple assessments required measure inter-coder reliability. The difficulty the assessors had in deciding how to answer some of these questions exposed the complexity of assessing heterogeneous websites based on small page samples. Although the policy assessment is fairly prone to the same operational problems, the study team never expected a simple and objective standard for that assessment.

Another issue affected the objectivity of the technical and policy evaluations. As discussed briefly above, some of the criteria assess specific elements such as webpages or hyperlinks. The websites assessed contained numerous pages and links, and so criteria seldom could be answered with a simple yes or no. Instead, the evaluator had to make judgments regarding the extent to which the site complied with given criteria, and then force a binary decision, yes or no, when most sites were neither fully compliant nor fully non-compliant.

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Recommendation: The evaluation procedure should specify the extent to which the site will be evaluated (*e.g.*, the number of pages, documents, links, *etc.*) and explicitly include criteria for evaluating the extent of compliance (*e.g.*, 90% pages in compliance would rate outstanding, 80% excellent, 70% good, *etc.*).

System Dependencies

A second issue germane to all the evaluations pertains to criteria which may produce varying responses depending on the hardware and software used. One criterion specifies that webpages should not exceed three screen lengths. Conformance to this criterion can depend on the size and resolution of the monitor, as well as the configuration of the Web browser. Additionally, while some websites did depict graphical hyperlinks by highlighting them in blue, in other instances the highlighting did not display well. This problem may well have been a function of the resolution and color settings of the client system. The federal consortium specifically advises in its guidelines that federal websites, to the extent possible, should work with all Web browsers and on a variety of hardware. Given the range of hardware and software configurations available, this advice represents an ideal.

Recommendation: website evaluation should include the use of a variety of system configurations, browsers, and communications links. It is neither desirable nor practical to test all possible configurations, yet it should be possible to test both generic low and high-end systems using the leading browsers.

Assessing a Moving Target

The technical and policy assessments revealed the importance that timing can play in assessing a website, particularly in conducting an external assessment. The researchers assessed the Stat-USA website, and then several days later while downloading several pages to review discovered that significant changes (at least in terms of the evaluation) had since occurred. Though the look and feel of the site remained largely the same, the Web administrator had apparently gone through the site and redesigned many of its pages to be consistent with the guideline that 'Webpages should not be longer than three screens,' and, incorporated some of the new frame-based design features that can improve the appearance and usability of the site. Clearly, many websites are undergoing near continuous change.

Conceptualizing Websites

Among the most difficult issues to emerge during the technical and policy assessments concerned the identification of the proper object or objects to which criteria referred. The intent was to provide a

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means for assessing federal websites, but in doing the assessments it became clear that for some websites a singular assessment of the entire site could not produce fair and comprehensive outcomes. Some sort of generalized taxonomy of federal website form and function is necessary for the approach attempted in this study to work most effectively. Short term alternatives to the classification approach could be evaluating only according to elements a website should and/or should not have comprehensively for the entire website (all pages). Such an approach deals only with matters of kind, and does not recognize matters of degree. Otherwise, a more articulated sampling procedure might be devised to collect a representative collection of webpages for complete assessment.

Federal websites can be massive. Realizing that it would not be practical to assess every web page, the study team elected to identify five pages to assess and generalize the results to the website as a whole. In retrospect, for some sites this approach may not have provided an adequate characterization of the websites as research constructs. Is a website an organizational construct, for example, and are the component webpages maintained by a single Web administrator? Is it a system (hardware and or software) construct operating on a single, or set of, closely coupled Web servers? Is a website more properly conceived as a service construct where a coherent collection of information and services constitute the object of interest -- regardless of how the collection is mounted on the Web or administered? The nature of the Web is such that any of these alternatives could prove useful. From federal policy and assessment perspectives there needs to be careful consideration of how the website or service is to be conceptualized.

The issues described above affect technical assessments of federal websites because of the range of content and information services that can be provided by a single federal agency. Design guidelines typically call for establishing a consistent "look and feel" for websites. The Census Bureau website, for instance, has done a good job of complying with this provision. However, webpages related to the Tiger Mapping Service (example pages are included in Appendix 1A) established a distinct look and feel as exemplified by the use of a tiger logo and the inclusion of a return to homepage link at the bottom of these pages returning users to the Tiger Mapping Service homepage rather than the Census Bureau homepage. The operation of a service within a service (or perhaps more accurately stated, a website within a website) may be perfectly legitimate, and may in fact be one of the particular strengths of websites. In the context

of the assessment, however, the procedures used did not adequately account for this organizational relationship.

> Recommendation: Consistent with the recommendation provided above, prior to conducting an assessment, evaluators should coordinate with the website administrators to determine if the website hosts (or points to) distinct services that merit separate evaluations. To a large degree, software such as WebMapper used in this study can provide a great deal of detail in advance of technical or user assessments to evaluators.

Conceptualizing Webpages

Because of the hyperlink capabilities of the Web, webpages can serve as indexes -- pointing directly to content or to other indexes -- or to combinations of content and indexing. Combining content and indexing on web pages represents high potential for the Web, but it comes at a significant cost. Web authoring tools are making it increasingly easy to convert documents originally prepared for print publication into HTML formats, and then create index pages that point to the electronic version. Unfortunately, the electronic documents seldom include the standard banners or navigation bars, or conform to the three-screen and anchoring criteria recommended for Web publication.

Due to their desire to make a wide variety of information accessible via the Web, many federal agencies can be criticized for failing to conform their websites to the aforementioned criteria. Yet, if resource limitations force a choice between having a greater number of minimally formatted HTML information available, as opposed to a more limited number of fully compliant documents specifically authored for the Web, it might be preferable to err in favor of increasing the amount of content. Of course, federal Web administrators will need to ascertain the needs and desires of their target audiences in determining the appropriate balance between these two alternatives.

> Recommendation: It would seem that different criteria might be required for evaluating web pages serving the distinct functions described above. Additionally, given the inevitability of restricted resources, agencies should confer with key stakeholders to determine whether they should maximize the amount of content available via the Web (implying minimal Web-specific authoring) versus limiting the amount of content made available, while still investing resources to produce quality information designed to take advantage of Web technology.[10]

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[10] This discussion of potential webpage categories is certainly not exhaustive. For example, webpages that solicit information, provide searching aides or user assistance might all merit the development of specific assessment criteria.

Selection of Users / Assessors

The selection of assessors can significantly influence the results of the evaluation and the quality of information provided. While federal websites have and implicit obligation to serve the information needs of all U.S. citizens, it is not possible to tailor websites to meet all the needs and preferences of such a disparate set of users -- disparate not only in terms of education and cognitive need, but also in terms of how and for what purposes the website is accessed (and if they have the capability to access it). While some users may prefer highly formatted content optimized for online browsing, others may want minimally formatted text suitable for downloading and offline applications. Federal Web administrators should also consider the needs of the disabled users when designing websites.

> Recommendation: Federal website administrators should identify target audiences and select user / assessors that best reflect those audiences. It may be that multiple audiences are being served and a sample of users from each audience could be selected to perform website evaluations. With respect to use of qualitative techniques, selection of exemplar users with actual information needs is more important than attempting to select a statistically representative sample form the general population.

Use of Structured Versus Unstructured Assessment Techniques

The various instruments developed and evaluated in this study provide a relatively parsimonious means for assessing general satisfaction with federal websites. The instruments permit Web administrators to collect relevant data from a large number of users at fairly low cost. One should be cautious in reporting the results of such studies, though. While the instruments themselves displayed an acceptable level of external validity, the difficulties inherent in drawing statistically representative samples form the population should not be underestimated.

Conversely, most qualitative evaluation techniques do not attempt to obtain statistically representative samples. The lack of statistical sampling does not imply that it is impossible to make valid inferences to a more general population, however. The real strength of using more qualitative methods lies in the type of information that can be produced. The "Think Aloud" protocol that was used provided more that an assessment of user satisfaction: It provided a means for observing the actual use or navigation of the website, identifying where and what types of problems the evaluator experienced, as well as which portions of the website worked well.

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Recommendation: Federal website administrators should identify target audiences and select assessors either from, or who fairly represent those audiences. A single website may serve multiple constituencies, and when such is the case samples of users from various assessors could perform website evaluations.

Resource Limitations and the Need to Assess Federal Websites

In an environment where resources are constrained, meaning nearly all, one can easily rationalize that limited resources are better spent posting content available on the Web rather than evaluating how the website gets used, particularly in light of the electronic Freedom of Information Act provisions mandating federal agencies to provide access to electronic versions of specific types of information. However, there is some merit to the saying that: "If it's worth doing, it is worth doing well." Without some level of evaluation, it simply is not possible to tell whether an acceptable, much less optimal, level of service is being provided.

Although the assessment methods and instruments described in this report require refinement, they provide strong bases for conducting internal evaluations. If an agency's ability to recruit external reviewers is for some reason limited, it may be possible to recruit a limited number of in-house personnel (preferably not the website developers, administrators, or content providers, though each may have their voice) to perform a limited number of user-based qualitative assessments.

Recommendation: Federal website administrators should not permit a lack of resources needed to conduct a comprehensive website assessment prevent them form attempting to perform any evaluation at all. Even a small assessment conducted rigorously and honestly can provide information that can be used to significantly increase the usefulness and quality of the website.

Recommendations for Future Research

The study was exploratory in nature and accordingly identified questions and issues for conducting further research. Below are key issues to be addressed:

- Testing internal validity (convergent / discriminant validity) and external validity for the structured instrumentation continues to be an important issue. With regard to external validity further research is required to determine to what degree conformance with technical criteria is associated with user satisfaction.

- Additional clarification is needed on the concepts of website and webpage. How should appropriate units of analysis be determined? Should different criteria, or criteria weightings, be applied for web pages serving different functions?

- The various types of log analyses offer significant opportunities for research. Of great interest to this study team is exploration of cross log analysis techniques, *i.e.*, using data from multiple logs in sophisticated statistical analysis programs.

- Understanding individual versus group preferences for websites is an interesting research problem. Webmasters are often forced to design sites and pages for "the greatest good." But in fact, this study found a wide range of idiosyncratic preferences for specific aspects of websites and pages.

These research topics are identified as the most interesting ones to pursue from the perspective of the study team. Clearly, numerous others also appeared during the course of the study.

During the site visit to Stat-USA, the researchers asked the administrators what they foresaw as top priorities for the website in the near future. Without hesitation they responded that "push technology" was emerging as an important feature on the horizon (McGarvey, 1997; Novak and Hoffman, 1996: 37).[11] Stat-USA currently serves as a website repository of statistical data. The staff of Stat-USA envision being able to "market" the data to potential subscribers, as well as deliver packaged content online as an active service. Building push technology into their federal website is a way in which the Web is advancing new models into government information management and dissemination. Stat-USA's entrepreneurial experiment will move into a new phase if indeed the website begins niche marketing using new intelligent push technology. Not everyone, it should be noted, is as sanguine about the potential of push technology (Brenner, 1997: 11).

Importance of User-Based Evaluation

As more Federal agencies invest in websites to disseminate information and provide services, questions concerning the selection and configuration of appropriate Web technologies, the appropriate types and levels of services to provide over such websites, the types of information made available, and a range of related questions will continue to be asked. Increasingly, policymakers, as well as users, are asking questions -- not about whether their agency should invest website development -- but about ways to maximize the benefits and impacts of existing Web initiatives.

The notion of the "networked environment" encompasses a range of electronic networked activities and services. Minimally, the networked environment includes information services, products, hardware and software, telecommunications infrastructure, and resources that users and providers of the

[11] Push technology is a means of actively delivering information to a user (presumably a subscriber to an information delivery service), instead of presenting the same information on a website and requiring that the user come to it. Synonyms include pointcasting, narrowcasting, niche marketing and direct marketing.

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network receive via the various electronic networks. Increasingly, Federal agencies are relying on Web-based technologies to provide a range of information and services.

To a large extent, proponents for developing Web-based services have engaged in a "technology as a magic bullet" approach, claiming that websites improve a person's quality of life, improve overall productivity, and enhance the competitiveness of an organization -- among other things. But the reality is that hard evidence to support such assertions is extremely limited or anecdotal. In times of budget cuts and federal retrenchment (such as we are seeing today), proponents of Web-based services will find it increasingly difficult to justify expenses for deploying such technology, without also being able to demonstrate that Web-based services *really* have some impact in meeting specific individual or organizational objectives.

In this Web-based environment, however, there is the potential to provide a huge array of information products and services. The concept of Web-based information services is an evolving one. Assessment techniques, however, related to Web-based information services by specific audiences such as government officials, teachers, business persons, researchers, students, librarians, *etc.* are just in the development process. Thus, some key questions that will continue to be asked are:

- What are the scope and reach of Web-based information services?
- How much use do websites and individual pages receive and why are they used?
- What types of users access the website and to what types of services and activities do they connect?
- What are the costs for providing various types of Web-based services?
- How has access to and use of Web-based services affected organizations and individuals in terms of economic competitiveness, education, productivity, quality of life, and other traditional performance indicators?
- What types of performance measures are appropriate to determine the impact of Web-based services on various stakeholder groups?
- What types of evaluation tools can assist policymakers website managers, and researchers measure those identified performance measures?

To date, there has been little practical guidance offered to assess federal websites and Web-based services. As agencies implement new information technologies and expand Web-based services there will also be a

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need for evaluation methods and measures to demonstrate that the resources invested in such efforts have had some positive impact on the users they serve.

The work reported in this study suggests that developing assessment techniques for federal websites and Web-based services is a multi-dimensional process due to the complex technological nature of Webs and the Web environment *as well as* the complex behavior and information needs of users. Nonetheless, the report offers several methods to evaluate federal websites and Web-based services, and identifies and discusses key issues and findings that affect the successful evaluation of such services.

The efforts discussed in this report offer a beginning framework for describing, defining, and operationalizing assessment tools for federal websites and Web-based services -- with an emphasis on assessment from a user perspective. As noted by Brigman (1997, *Supplement 3*):

> The single most important issue for any website is taking the time to step back from your vision of yourself as a company or a department, and seeing the site as your visitors do.

This perspective is an underlying theme throughout the study reported here. Within the context of this theme, the study offers assessment techniques to evaluate interactions and services within this environment so that researchers, users, decision makers, and policymakers do not have to guess at what seems to work well and why. Although the federal website and Web-based services environment is dynamic and constantly evolving, there is a need for a core set of measures and assessment techniques that evaluate Web-based services, activities, and technologies. Strategies suggested in this report offer a first step in meeting this objective.

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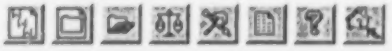
APPENDICES

1. SYSTEM-BASED ASSESSMENTS

A. Website Mapping
B. Web Server Log File Analysis

1. A. WEBSITE MAPPING

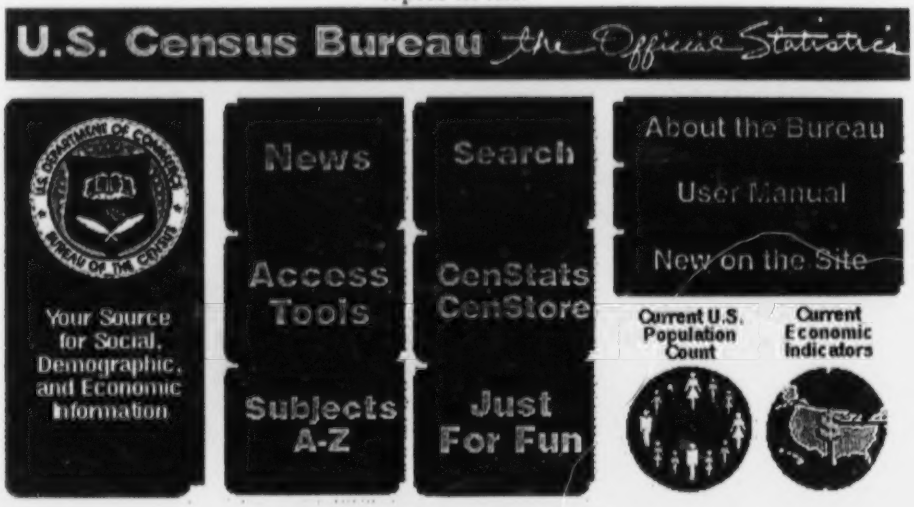
NetCarta WebMapper™ Home Page



Navigate either from the icons above or the main menu shown below.

- **New Map from URL:** Create new map from URL and generate reports
- **New Map from File:** Create new map from file and generate reports
- **Open Map:** Open map and generate reports
- **Compare:** Compare two maps and generate reports
- **Verify:** Verify links
- **Report:** View saved reports
- **Help:** View help information

topics in text



Last Revised: *May 07, 1997*

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The study team was unable to produce a website map of the Census website (http://www.census.gov/).

National Archives and Records Administration

WELCOME!

From the Archivist

NARA's Organization

Building for the Future

Locations and Hours

Washington, DC, Facilities

Regional Archives

Records Centers

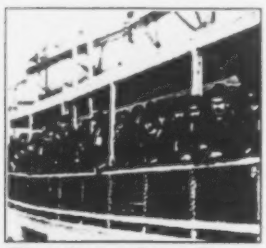
Presidential Libraries

Federal Register

NARA Gopher

What's New

Highlights



The Genealogy Page

Welcome to the National Archives and Records Administration (NARA). NARA is the government agency responsible for overseeing the management of the records of the federal government. NARA ensures, for the Citizen and the Public Servant, for the President and the Congress and the Courts, ready access to essential evidence that documents the rights of American citizens, the actions of federal officials, and the national experience.

The Visitor's Gallery

- Online Exhibit Hall: selected NARA exhibitions
- Gift Shop and Bookstore: publications and merchandise relating to NARA and its holdings
- The Digital Classroom: ideas, programs, and publications for the teacher
- Public Programs: conferences, training programs, lectures, films, tours, and other public events

Looking for Information in the National Archives

Genealogy and Individuals

The Genealogy Page provides general information on NARA's resources on individuals, such as **veterans**, as well as guides to the use of NARA holdings. There are only a **very few** genealogical records currently available online .

Historical Records of Government Agencies

NARA makes available to the public the historically valuable records of the three branches of federal government: **executive** (including the President), **legislative**, and **judicial**. National Archives holdings include **textual**; **audiovisual**; **cartographic and architectural**; and **electronic** records.

The Guide to Federal Records in the National Archives of the United States provides general information about holdings for all three branches. You can also search for information about the National Archives in the following databases:

Featured Document: A Letter from Jackie Robinson

Records Management Workshops

More Highlights

- Milo Ryan Phonoarchive
- Research and National History Day

NARA Archival Information Locator (NAIL)
John F. Kennedy Assassination Records Collection

Current Government Information

NARA publishes the Federal Register, the daily official record of the Federal government, the *U.S. Government Manual*, the *Privacy Act Issuances Compilation*, the *Public Laws*, and the *Code of Federal Regulations*. The Government Information Locator Service (GILS) is a searchable database of information about NARA information resources with links to other sources of government information.

NARA also coordinates the Electoral College process for choosing the President and Vice President of the United States.

Professional Services

Records management **Archival management**
Grants **NARA Library**
Preservation **Internet Resources**
Employment and Internships

National Archives and Records Administration
URL: http://www.nara.gov/
Questions, Comments, or Complaints?
Last updated: April 10, 1997

Summary Report for www.nara.gov

Hierarchy Pages Images Media Gateways Internet Back to Reports Help
Error Report Duplicates Offsite InLinks Unexplored Back to Main Index

NetCarta WebMap for www.nara.gov

Object Statistics

Type	Count	Size
Pages	261	145219
Images	84	150407
Gateways	2	N/A
Internet	37	N/A
Java	0	0
Applications	2	0
Audio	0	0
Video	0	0
Text	5	0
NetCarta WebMaps	0	0
Other Media	0	0
Totals	391	295626

Status Summary

	Objects	Links
Onsite	**299**	**461**
OK	48	178
Not Found (404)	0	0
Other Errors	0	0
Unverified	251	283
Offsite	**92**	**128**
OK	4	7
Not Found (404)	0	0
Other Errors	0	0
Unverified	88	121
Totals	**391**	**589**

Map Statistics

Map Date	Dec 12 12:19 1996
Levels	4
Avg Links/Page	15

Server Summary

Domain:	www.nara.gov
Server Version:	Netscape-Commerce/1.
HTTP Version:	1.0

National Institutes of Health

Welcome - News - Health - Grants - Science - Institutes - Employees

Can't find it? Try using the **NIH Search Engine.**
What's New -- The latest information on major additions to the central NIH home page.

Welcome to NIH

An overview and introduction to NIH including an employee directory and maps of the NIH "campus" in Bethesda, Maryland.

News and Events

The NIH Calendar of Events, press releases, special reports, and employment information.

Health Information

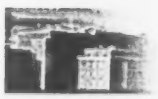
A selection of some NIH health resources such as CancerNet, AIDS information, Clinical Alerts, the Women's Health Initiative and the NIH Information Index (a subject-word guide to diseases and conditions under investigation at NIH).

Grants and Contracts

Information on NIH's extramural research and training programs including NIH's funding opportunities (with application kits), grant policy, and award data that includes access to the CRISP database.

Scientific Resources

Intramural (on-site) research news and information including special interest groups, on-line library catalogs and journals, research training information, NIH research labs on the web and computer and network support for NIH scientists.



Institutes and Offices

The NIH home page is only the beginning. Here you will find links to the many individual organizations that collectively make-up the NIH. Some of these sites provide full-text consumer health publications.

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Information for Employees

Work place information including emergency services, assistance for persons with disabilities, parking, facilities management, telecommunications, administrative resources such as the NIH manual chapters and the NIH WWW guidelines, employment information, and other services such as the NIH Federal Credit Union.

We welcome your questions and comments; however, you may want to try our NIH Search Engine before writing. Please send general questions and comments about NIH and its medical research programs to the Office of Communications. Technical questions about this Web site can be addressed to the computer support staff.

National Institutes of Health (NIH)
Bethesda, Maryland 20892

Summary Report for www.nih.gov

Hierarchy Pages Images Media Gateways Internet Back to Reports Help
Error Report Duplicates Offsite InLinks Unexplored Back to Main Index

NetCarta WebMap for www.nih.gov

Object Statistics

Type	Count	Size
Pages	251	509297
Images	50	38359
Gateways	3	N/A
Internet	27	N/A
Java	0	0
Applications	0	0
Audio	0	0
Video	0	0
Text	0	0
NetCarta WebMaps	0	0
Other Media	1	0
Totals	332	547656

Status Summary

	Objects	Links
Onsite	**220**	**491**
OK	59	289
Not Found (404)	0	0
Other Errors	0	0
Unverified	161	202
Offsite	**112**	**173**
OK	8	23
Not Found (404)	1	1
Other Errors	0	0
Unverified	103	149
Totals	**332**	**664**

Map Statistics

Map Date	Apr 01 09:41 1997
Levels	4
Avg Links/Page	14

Server Summary

Domain:	www.nih.gov
Server Version:	Apache/1.1.1
HTTP Version:	1.0

Mostly Text Version

Home
Index
Order Form
What's New
Other Products
Test Drive
Comments
Help

STAT-USA/Internet

- What's New!
- How to Subscribe

- Daily Economic News
- Frequently Requested Statistical Releases
- Information By Subject
  - Export & International Trade
  - Domestic Economic News & Statistical Series
  - Business Leads & Procurement Opportunities
- STAT-USA Databases
- Selected Publications of Interest

- the Newsletter

A Service of the U.S. Department of Commerce

Last Modified: April 03, 1997 | stat-usa@doc.gov | U.S. Department of Commerce

Summary Report for www.stat-usa.gov

Hierarchy Pages Images Media Gateways Internet Back to Reports Help
Error Report Duplicates Offsite InLinks Unexplored Back to Main Index

NetCarta WebMap for www.stat-usa.gov

Object Statistics

Type	Count	Size
Pages	420	515621
Images	17	171392
Gateways	7	N/A
Internet	6	N/A
Java	0	0
Applications	66	30263301
Audio	0	0
Video	0	0
Text	48	821424
NetCarta WebMaps	0	0
Other Media	348	2952656
Totals	**912**	**34724394**

Status Summary

	Objects	Links
Onsite	**876**	**1511**
OK	443	780
Not Found (404)	20	20
Other Errors	413	711
Unverified	0	0
Offsite	**36**	**57**
OK	28	45
Not Found (404)	0	0
Other Errors	2	3
Unverified	6	9
Totals	**912**	**1568**

Map Statistics

Map Date	Dec 12 12:31 199
Levels	6
Avg Links/Page	4

Server Summary

Domain:	www.stat-usa.gov
Server Version:	Netscape-Commerce
HTTP Version:	1.0

Jeffrey H. Rubin
March 20, 1997

Analysis of Stat-USA Access Log: January 13, 1997 - January 20, 1997

Path analysis of specific users

Comparisons

1. Number of hits vs. number of accesses
2. Number of United States hits vs. outside countries
3. Path analysis of specific users

Analysis:

Understanding the path (thread) in which a user navigates through a site can unfold multiple uses, such as clock anaylysis, entry page, exit page, and more. This section will allow you to click on actual IP addresses or domain names that "hit" the Stat-USA server over the week of our analysis. After you click on your user you will be presented with the complete thread of that users visit throught the Stat-USA site. This information will tell you what page the user entered the Stat-USA site on, what pages they saw while on the site, and finally what page they exited the site on. At the bottom of the analysis you will see the time that each user spent on the Stat-USA site.

Below is a list of a few randomly picked users to be used for path analysis, this should not crash your browser, and it is intented to give a few examples of the usefulness of this type of analysis. **PLEASE NOTE** When you click on a user it may take a couple of minutes for the program to run and show you the results, please be patient.

Specific User Statistics (Sorted Numerically)		
Sub-domain	**Total Hits**	**Percentage of Total**
agrgate.agr.ca	881	0.352042324997802
www-az6.proxy.aol.com	826	0.33006465431122
beaadmin.bea.doc.gov	804	0.321273586036587
www-az1.proxy.aol.com	781	0.31208292374947
www-al3.proxy.aol.com	777	0.310484547699537
www-az3.proxy.aol.com	731	0.292103223125305
www-ac3.proxy.aol.com	707	0.282512966825705
199.98.151.47	696	0.278117432688389
www-af3.proxy.aol.com	661	0.264131642251473
www-ak3.proxy.aol.com	610	0.243752347614823
www-ao3.proxy.aol.com	609	0.24335275360234
www-ah3.proxy.aol.com	587	0.234561685327707
www-au3.proxy.aol.com	585	0.23376249730274
www-ab3.proxy.aol.com	567	0.226569805078041
giasbm01.vsnl.net.in	555	0.221774676928241
www-ai3.proxy.aol.com	528	0.210985638591191
anubis.kpmg.ca	523	0.208987668528775
208.134.226.212	520	0.207788886491325
www-ag3.proxy.aol.com	513	0.204991728403942
www-ae3.proxy.aol.com	511	0.204192540378975
pclaptop.confinst.appstate.edu	505	0.201794976304075
www-ad3.proxy.aol.com	502	0.200596194266625
www-j4.proxy.aol.com	500	0.199797006241658
kii.kochind.com	494	0.197399442166759
www-aj3.proxy.aol.com	493	0.196999848154275
ts4p24.batelnet.bs	485	0.193803096054409

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www-at3.proxy.aol.com	482	0.192604314016959
www-aa3.proxy.aol.com	481	0.192204720004475
www-ap9.proxy.aol.com	470	0.187809185867159
www-as3.proxy.aol.com	469	0.187409591854676
www-ar9.proxy.aol.com	436	0.174222989442726
proxy.logos.cy.net	432	0.172624613392793
www-h7.proxy.aol.com	430	0.171825425367826
www-ap3.proxy.aol.com	425	0.16982745530541
bercy-ppp.clark.net	42[illegible]	0.168229079255476
www-an3.proxy.aol.com	413	0.16503232715561
198.83.13.45	407	0.16263476308071
192.239.70.21	405	0.161835575055743
igate.mckinsey.com	404	0.16143598104326
biogen-bh.biogen.com	403	0.161036387030777
inf107.logiccontrol.es	400	0.159837604993327
www-e4.proxy.aol.com	396	0.158239228943394
market1.cci.cubic.com	392	0.15664085289346
host14.cyberg8t.com	391	0.156241258880977
gateway5.ey.com	390	0.155841664868494
webcache01.u.washington.edu	390	0.155841664868494
toutainl.bschool.unc.edu	385	0.153843694806077
bastion.fdic.gov	384	0.153444100793594
www-am3.proxy.aol.com	374	0.149448160668761
www-ar3.proxy.aol.com	356	0.142255468444061

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access_log

www.stat-usa.gov
03.19.97

Number of unique ip addresses: 14151
How many arrive at initial page: 11763
Percentage that arrive at initial page (# of initial / # of accesses): 8.32360371070117

Major Domain Statistics				
Domain type	**Total Hits**	**Percentage of Total Hits**	**Total Accesses**	**Percentage of Total Accesses**
com	78688	31.4432536542872	53964	38.1854076888785
edu	34073	13.6153667873441	22388	15.8419484719185
gov	6379	2.54901020563108	3884	2.74835304024172
mil	403	0.161036387030777	204	0.144352219415373
net	38306	15.3068482421859	25298	17.9010904253437
org	3194	1.27630327587171	2124	1.50296134332477
United Arab Emirates	146	0.0583407258225643	112	0.0792521988947149
Argentina	169	0.0675313881096806	81	0.0573163224149277
Austria	105	0.0419573713107483	65	0.0459945797156827
Australia	816	0.326068714186387	500	0.353804459351406
Belgium	242	0.0967017510209627	143	0.101188075374502
Bulgaria	19	0.00759228623718302	10	0.00707608918702811
Bahrain	8	0.00319675209986654	4	0.00283043567481125
Bermuda	22	0.00879106827463297	16	0.011321742699245
Brunei Darussalam	1	0.000399594012483317	1	0.000707608918702811
Bolivia	19	0.00759228623718302	14	0.00990652486183936
Brazil	408	0.163034357093193	261	0.184685927781434
Bahamas	485	0.193803096054409	271	0.191762016968462
Canada	5259	2.10146491164976	3572	2.52757905760644
Switzerland	106	0.0423569653232316	40	0.0283043567481125
Chile	160	0.0639350419973307	116	0.0820826345695261
China	185	0.0739248923094136	121	0.0856206791630402
Colombia	85	0.0339654910610819	41	0.0290119656668153
Costa Rica	75	0.0299695509362488	40	0.0283043567481125
Czech Republic	119	0.0475516874855147	67	0.0474097975530884
Germany	422	0.16862867326796	250	0.176902229675703
Denmark	215	0.0859127126839131	130	0.0919891594313655

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Dominica	4	0.00159837604993327	3	0.00212282675610843
Dominican Republic	106	0.0423569653232316	93	0.0658076294393615
Estonia	2	0.000799188024966634	1	0.00070760891870281 1
Egypt	21	0.00839147426214966	13	0.00919891594313655
Spain	1044	0.417176149032583	445	0.314885968822751
Finland	386	0.15424328881856	217	0.15355113535851
France	844	0.337257346535919	545	0.385646860693032
Greece	149	0.0595395078600142	133	0.0941119861874739
Guatemala	46	0.0183813245742326	27	0.0191054408049759
Hong Kong	165	0.0659330120597473	106	0.075006545382498
Croatia (Hrvatska)	234	0.0935049989210962	189	0.133738085634831
Hungary	95	0.0379614311859151	61	0.0431641440408715
Indonesia	65	0.0259736108114156	35	0.0247663121545984
Ireland	567	0.226569805078041	543	0.384231642855627
Israel	887	0.354439889072702	624	0.441547965270554
India	578	0.230965339215357	569	0.4026294747419
Iceland	6	0.0023975640748999	4	0.00283043567481125
Italy	858	0.342851662710686	584	0.413243608522442
Jamaica	4	0.00159837604993327	2	0.00141521783740562
Jordan	172	0.0687301701471305	147	0.104018511049313
Japan	1895	0.757230653655886	1014	0.717515443564651
Korea (South)	409	0.163433951105677	213	0.150720699683699
Kuwait	273	0.109089165407946	244	0.172656576163486
Saint Lucia	9	0.00359634611234985	6	0.00424565351221687
Liechtenstein	47	0.0187809185867159	34	0.0240587032358956
Sri Lanka	43	0.0171825425367826	33	0.0233510943171928
Lithuania	6	0.0023975640748999	2	0.00141521783740562
Luxembourg	1	0.000399594012483317	1	0.000707608918702811
Latvia	57	0.0227768587115491	24	0.0169826140488675
Mexico	448	0.179018117592526	305	0.215820720204357
Malaysia	121	0.0483508755104814	58	0.0410413172847631
Nicaragua	22	0.00879106827463297	11	0.00778369810573092
Netherlands	668	0.266928800338856	381	0.269598998025771
Norway	415	0.165831515180577	310	0.219358764797872
New Zealand (Aotearoa)	83	0.0331663030361153	37	0.026181529992004
Peru	100	0.0399594012483317	75	0.0530706689027109
Philippines	10	0.00399594012483317	4	0.00283043567481125
Pakistan	60	0.0239756407489 99	25	0.0176902229675703

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Poland	159	0.0635354479848474	75	0.0530706689027109
Portugal	128	0.0511480335978646	51	0.0360880548538434
Romania	34	0.0135861964244328	19	0.0134445694553534
Russian Federation	162	0.0647342300222973	92	0.0651000205206586
Sweden	481	0.192204720004475	287	0.203083759667707
Singapore	340	0.135861964244328	166	0.117463080504667
Slovenia	24	0.00959025629959961	12	0.00849130702443374
Slovak Republic	1	0.000399594012483317	1	0.000707608918702811
USSR (former)	73	0.0291703629112821	42	0.0297195745855181
El Salvador	84	0.0335658970485986	73	0.0516554510653052
Thailand	509	0.203393352354008	311	0.220066373716574
Turkey	203	0.0811175845341133	96	0.0679304561954699
Taiwan	93	0.0371622431609485	59	0.0417489262034659
Ukraine	39	0.0155841664868494	20	0.0141521783740562
United Kingdom	1949	0.778808730329985	1206	0.85337635595559
United States	1303	0.520670998265762	836	0.59156105603555
Uruguay	6	0.0023975640748999	6	0.00424565351221687
Yugoslavia	11	0.00439553413731649	6	0.00424565351221687
South Africa	217	0.0867119007088798	144	0.101895684293205
Other	63429	25.3458486178043	16984	12.0180298752485
Total	**250254**	**100**	**141321**	**100**

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2. USER-BASED ASSESSMENTS

A. Situated Proxies' Assessments Evaluation Protocols: IST Webmasters Focus Group
B. Intermediate Criteria
C. Linkages Between User Questions And Criteria Chosen For Investigation
D. Sign-Up Sheet To Participate In Assessment Of Federal Websites
E. Researcher's Instructions For Conducting Situated Analysis
F. Demographics And Survey Form
G. Assessment Criteria (Used)
H. Assessment Criteria (Revised)
I. Focus Group Probes

2. A. SITUATED PROXIES' ASSESSMENTS EVALUATION PROTOCOLS: IST WEBMASTERS FOCUS GROUP

The purpose of this focus group was to gather information from experienced Internet users to develop potential questions which can be used in an website assessment. The group consisted of six participants, the researcher and myself.

The discussion began with a study team member describing the intention of the focus group. Participants then questioned whether we knew who the users of the website would be. Absence of this knowledge prompted difficulty in their ability to evaluate a website. Many felt that this was essential information to perform the task at hand.

After informing participants that the users would not be known the researcher asked the group to come up with a list of criteria or smaller questions for each of seven pre-prepared questions.

A listing of each of the pre-prepared questions followed by the focus groups responses proceeds. Note, responses are listed as possible smaller questions to answer pre-prepared questions.

Q1 Does the layout of the page present a logical organization of the information and services available?

[it was suggested that the contents page is prone to have logical organization. The question arose however as to what page we are talking about or if we are talking about the entire site]

- Does the site have some kind of navigation
- Is the table of contents logical

[someone mentioned that there can be different kinds of logical organization, linear or chronological]

[another participant suggested that the first page is a splash screen which entices the user, and the next page is where the navigation of the site should begin]

[the discussion was then directed specifically at the homepage]

- Does it provide mechanisms to navigate through site
- Does the layout help the user understand the overall structure of site
- The first couple of pages should provide depth of site

[someone commented on how this might be problematic. For example, how many links determines depth?]

- Does the user know what the website is about from this page
- Is the wording on the page easy to understand

[the discussion then moved into what constitutes a good layout]

- Is it one that the user can interface with, with little to no difficulty
- Do things line up, is information separated (there should be defined categories)
- Does it fit different platforms (different screen sizes)
- Is the navigation clearly designed
- Is there built in navigation or does the user have to use the browser to navigate
- Is user able to find what they are looking for

- Does it attract people

Q2 Does the website design seem cluttered?

[again, participants questioned whether we were talking about one page or multiple pages. The decision was to assume one page]

- Is the page too wordy
- Are there too many graphics
- Are there too many links, options for users
- It is to cluttered, does the user have to shift through many pages

[someone suggested that it might be helpful to look at how people evaluate the design of print material for possible guidance]

[at this point the discussion focused on the website as a whole]

- Is there consistency throughout (visual cues and navigation is the same)
- Does navigation get the user lost or is the user unable to find navigation
- Is the hierarchy clearly defined
- Is there clear definition of where the user is in the site, the Web is relational not just hierarchical
- Does every page have a name to inform the user of what site he/she is on

Q3 Is the design consistent throughout the site?

- Things should be kept in the same areas and the same size. For example, navigation should always be the same and in same place. Banners should also always be the same size
- Is the content the same throughout

[someone suggested that the user should have the ability to download the entire document so that person does not have to go back and forth through all the different pages]

- If it is one long document does if offer hotlinks to jump to desired areas
- The background should have a consistent metaphor throughout

Q4 Is help information needed in order to navigate this website?

[one participant suggested that if the user needs help then something is wrong with the site]

[it was also suggested that there is a certain basic knowledge that users of the Web should posses (*e.g.*, blue text is a hyperlink and will take the user somewhere else, forward, backward). If every site was to discuss these fundamental things then sites could get frustrating]

[one person commented that a map of the entire site would be nice. This would allow the user to rise above the maze to view where they were]

[another person mentioned that a hierarchy of menu options could also be used instead of a map which would achieve the same thing]

- Is text to small to read

- Does site offer help about its particular layout or icons

[one suggestions was that the site could offer a list of frequently asked questions]

- If site has a search engine does it support it with help instructions

[it was also mentioned that contact information on a site is a nice feature]

- Are there ways to get more information

Q5 To what degree is skill in navigating the Internet needed for navigating this website?

[someone pointed out that if the user has to use the browser then there is no navigational tools on the site]

- Are backward and forward buttons consistent with Internet standards
- Is the terminology consistent with where the user actually ends up
- Are there descriptive words which describe where a link will take the user

[it was discussed that a site could offer a button that offers navigational help as well as Internet basics and could even be divided up by level of expertise (ex. novice or advance)]

- What level of knowledge does page assume

Q6 Do the graphics guide the user through the website?

- Is the graphic clearly defined as a link or just an image
- Are the graphics consistent throughout
- Are the tools consistent same throughout

Q7 Does the help information explain how to navigate within the website?

- Does it explain what the icons or images mean
- Does each time the user use a help tool it performs the same
- Does the site explain what underlined text means
- Did the help information answer the user's question
- Did the help information explain the site's structure
- Did the help information explain the site's objective
- Did the help information explain the site's navigation

[it was suggested by a participant that this question was closely related to Q4 or could even serve as a sub-question to Q4]

2. B. INTERMEDIATE CRITERIA

Criteria For The Evaluation Of Websites

I. INFORMATION CONTENT CRITERIA

This section evaluates the substantive aspects of the website.

Orientation to Website

- A website overview is provided.
- The scope of website is clearly stated.
- The services and information provided at the website are described.
- Instructions on the use of the website are provided.
- The purpose/mission should be appropriate to the targeted audience(s).
- A liability statement warning the user of information provided through the links is provided (*e.g.*, access by children).
- Copyright statements are provided if necessary.

Content

- The content of the homepage should match the purpose/mission.
- The content and links match the needs of the expected audience.
- The website includes only necessary and useful information.
- Content coverage does not overlap.
- The amount of information is significant and not overwhelming and is balanced throughout the website.
- Full text references or other resources are available.
- The content has rich and unique qualities that inspire users to visit the site regularly.
- The content is written in a clear and consistent language style that matches the expected audience.
- Avoids jargon, humor, condescension, accusation, and chit chat.
- Uses a positive and professional tone.
- Language does not show bias.
- Content is organized logically throughout the website and by anticipated user need.

Currency

- Address of contact person and last update information appears at the bottom of pages with substantive content.
- Pages have been updated in the past three months.
- The content provided by the website creators is up-to-date.

Bibliographic Control

- Headings are clearly phrased, descriptive and understandable.
- Each screen is titled clearly.
- If the headings cannot be completely descriptive, coherent and concise, descriptions follow.
- The information that is provided through the link matches the headings and descriptions.
- Terminology and layout are consistent within the headings throughout the website.

Services (if provided)

- Provision of services is different than provision of information resources, (*e.g.*, leaving a question to be answered by the reference staff is a service).
- Are the services open to everyone on the Internet or do portions require fees?
- Services meet the needs of the user.
- Services are fully operational.

Accuracy

- Statement of document/website status is provided (*e.g.*, if in progress will note, "under construction").
- Reference or sources of information cited are accurate.
- Typing, spelling, and grammar errors and other inconsistencies are absent.

Privacy

- Degree to which the site provides users with explicit policy on how users' privacy rights are protected.
- Degree to which the site provides users with information about making public site-use information, repackaging, or selling such information to others.
- Can the user exchange encrypted information with the site?

II. EASE-OF-USE CRITERIA

This section evaluates physical movement through the website.

Quality of Links

- There are no dead-end links.
- Temporary forwarding addresses do not qualify as good links.
- "What's new" section provided for new links (good for frequent users).
- Shortcut links are possible for frequent users.
- Warning statements are provided if link will lead to large document or image.
- Indication of restricted access for a link is provided.
- Links are provided to mentioned documents.
- Speed.
- Minimal use of large graphics and bright colors so that document loading is relatively fast.

Feedback Mechanisms

- On the homepage and other significant pages there is a contact person: name, address and email address of the responsible person or entity; for example, <webadmin@library.org>.
- Feedback links are fully operational.

Accessibility

- There is an awareness of the existence of this website through search engines or other publicity.
- Full name of website organization is provided in the title, heading, document address, graphical link and/or URL in order that the source be recoverable.
- It is usually possible to reach the site. It is not frequently overloaded.
- The URL is not likely to be confused or mistyped.

Design

- Format is appropriate to subject matter and functionality. A good design directs users toward information rather than away from it.
- The screens are uncluttered.
- The format is consistent throughout the website.
- The homepage for the website is short and simple.
- The website is written in standard HTML language. The site is consistent when accessed via different browsers (text and graphic).
- Graphics and color lead the user through the information appropriately.
- Monster graphics are not used.
- Many little graphics are avoided.
- Use of bold, italics, blinking and other attention-getting devices is limited.
- User has the option of turning off the automatic loading of graphics.

Navigability

- Essential instructions appear before links requiring user interaction (*e.g.*, email).
- Navigation options are distinct and spelled out.
- Minimal user skills are required.
- All the parts work.
- Interactions are secured if they involve private information.
- Links are provided to return to website homepage on all supporting pages.
- Links are provided to assist navigation (*e.g.*, "return to top," "return to previous page").

2. C. LINKAGES BETWEEN USER QUESTIONS AND CRITERIA CHOSEN FOR INVESTIGATION:

The content and the links match the needs of the expected audience.

To what extent does the content fulfill your needs or interests?
Rate the quality of the site.
The overall content of the site matched my expectations.
Using this site would enable me to accomplish my desired tasks more quickly.
The site provided the precise information I needed.
The information on the site was relevant to me..

The scope of the website is clearly stated.

The site clearly indicated its scope and content.
I understand the purpose of this site.

The services and information provided at the website are described.

The site clearly described its services and information.

Content is organized logically throughout the website and by user's needs.

The site organized its information in a way that was easy for me to understand..

Language does not show bias.

To what extent does the content avoid bias?

The amount of information is significant and not overwhelming and is balanced throughout the website.

To what extent does the site provide sufficient information?

Headers are clearly phrased, descriptive and understandable.

To what extent are the headers understandable?

The information that is provided through the links matches the headings and descriptions.

To what extent do the headers accurately reflect the content they describe?

Format is appropriate to the subject matter and functionality.

Rate the overall site deign.

The format is consistent throughout the website.

To what extent is the design consistent throughout the site?

Graphics and color are used to lead the user through the information appropriately.

To what extent is the use of graphics appropriate for the site?
To what extent are any of the design elements distracting?
The graphics helped me find my way around the site.

Minimal user skills are required.

It was easy to move to where I wanted to go.
It was easy to navigate around the site.
I would find it easy to find what I want at this site.
It would be easy for me to become skillful at using this site.
The site was easy to use.
Teaching a beginner to use this site would be easy.
It was easy to provide feedback to the site.

Navigation options are distinct and spelled out.

It is easy to understand what the navigation icons mean.

Feedback mechanism.

It was easy to provide feedback to the site.

2. D. SIGN-UP SHEET TO PARTICIPATE IN ASSESSMENT OF FEDERAL WEBSITES

Name: _____ **Email:** _____
Phone: _____

Availability - Please indicate exact days and times you are available.

Week of Nov. 25-29

_____

Week of Dec. 2 - 6

_____

Week of Dec. 10 - 13

_____

Listed below are the available websites for user-based assessment (Please circle which site(s) you would be interested in visiting)

1. Department of Commerce (Stat-USA)
2. Department of Defense
3. General Services Administration
4. National Archives and Records Administration
5. FedWorld Information Network
6. National Aeronautics and Space Administration
7. Bureau of the Census
8. National Institutes of Health
9. Federal Communications Commission

For more information about these sites see the back of this form.

2. E. RESEARCHER'S INSTRUCTIONS FOR CONDUCTING SITUATED ANALYSIS.

1. Set up Web browser and bookmark a warm-up site and the research site.

2. Thank the participant for coming, restate the purpose of the study and provide confidentiality statement, and ask if there are any questions. -- See **A** under participant instructions below.

3. Have participant fill out demographic data and give them an opportunity to glance over the rest of the survey form.

4. Provide instructions for the warm-up exercise. -- See **B** under participant instructions below.

5. Conduct warm-up exercise -- approximately five minutes.

6. Give the participant a chance to ask any question that may have arisen during the warm-up and reiterate instruction for the test. -- See **C** under participant instructions below.

7. After completion of test, spend a few minutes with the participant (still on tape) answering participant questions and asking the participant questions that may have occurred to you during the session.

8. Ask the participant to complete the questionnaire.

9. Thank the participant for their time and remind them to attend the focus group session -- Wednesday, December 11th -- IST Conference Room.

Participant Instructions.

Ask participants to excuse you for reading these instruction verbatim. While this may be a bit awkward, it will ensure that we do not mix up any of the instructions.

A. Thank you for agreeing to participate in this study. The purpose of this study is to identify and test assessment criteria and techniques that can be used to evaluate federal websites. Your participation is extremely helpful as it allows us to observe how an "interested" user interacts with a website.

We are going to use a combination of techniques to collect data during this session. We have a structured instrument for you to complete after the session and will be taping you during your Web visit.

We want you to understand that we are evaluating the website, **not you**, or your use of the website. In this regard, it is not really possible for you to make a mistake or do something wrong. To the extent possible, we hope that with a minor exception that we will explain, that you conduct your visit just as you normally would.

Although we don't anticipate confidentiality being an issue, be assured that the tapes and survey forms will only be accessed by the survey team and will be destroyed after the study is completed. Transcripts made from tapes and study findings may be retained but will not include personal identifiers.

Are you still willing to participate in this study?

Do you have any questions so far?

Now we would like you to fill out the demographic portion of the survey, then take some time to read the rest of the questionnaire so that you will understand the types of questions that we will be asking you to answer.

<pause>

Do you have any questions?

B. We are going to be using the "think aloud" method for collecting data during your Web visit. The method is fairly simple, but takes some getting used to as you will be asked to verbalize your thoughts as you work your way through the Web site. For many people, verbalizing their "stream of consciousness" is a bit unnatural. Therefore, we will have a short warm-up session to give you an opportunity to get used to the technique.

During the practice and your chosen site evaluation, we actually want you to perform **two** tasks at once. First, you will be searching the website for information relevant to your information need. Second, you will evaluate the website as you conduct your search.

The Think Aloud technique requires you to say out loud what enters your mind as you navigate the website. In addition to prompting you to continue talking, we will occasionally point to the banner at the top of the screen to remind you to continue to make evaluative comments. However, you do not need to limit your comments to the listed criteria. If any particular feature about the site strikes you as being positive or negative just say it. You don't need to explain why you think so -- just try to say everything that comes into the mind.

You can talk to the researcher and ask questions, although there may be some questions that we will not answer in order to minimize our biasing your responses. We will prompt you to keep talking if you pause for more than a couple of seconds. Don't worry if the thoughts in your mind seem ridiculous, or even if you are thinking that this exercise is ridiculous -- go ahead and say it! The trick is to pretty much let us fade into the background and just keep talking to yourself.

Furthermore, if you become "stuck" in one section of the website, we may urge you to move on.

We would like to give you a brief demonstration of a "think out loud" based site evaluation in order to make you feel more comfortable talking and to give you some idea of what we expect.

<give demonstration>

Any questions?

Ok, now its your turn! Remember, this is just for practice!

<Connect to the test site and begin.>

<pause> About 5 minutes no longer than 10. Less time is OK if the participant is comfortable with the technique.

OK, any questions?

Do you want another warm-up session?

C. Let's start the session. You do not have a set time that you need to spend visiting this site. We would like your visit to last at least 20 minutes and we will cut you off at the end of 45 minutes in order to get ready for the next participant. You were selected because you had some reason for visiting this site, school, work or personal.

Think about the purpose of your visit for a few seconds before starting your session.

<pause> What was your purpose?

Remember, we want you to just say whatever comes into your mind as you are navigating this site. However, we are particularly interested in hearing your evaluative thoughts and will occasionally point to the banner at the top of the screen to prompt you to make evaluative comments. When we point to the banner, it is not to prompt you to make a comment about a specific evaluative criterion. Rather, it is just to remind you to make "evaluative-like" comments. Feel free to comment on things other than the criteria listed on the banner.

We do ask that you primarily spend your time navigating the site to locate information rather then spending a great amount of time reading or downloading a particular document. Of course, looking over identified text to verify that you are interested in it or not is certainly appropriate as we do ask some questions concerning the quality of the website's content. If you find something that you are interested in, just bookmark the page and we can come back and retrieve it after the session is completed.

To summarize: During the session we will prompt you to keep talking, we may point at the banner at the top of the screen to remind you to make evaluative comments, and we may urge you to continue exploring the site if you become bogged down in a particular section.

Any final questions?

Please proceed.

2. F. DEMOGRAPHICS AND SURVEY FORM

OCLC FEDERAL WEBSITE SITUATED USER ASSESSMENT SURVEY
12/1/96

Name_____

Age_____

Major Concentration _____

Estimated Number of web pages Designed _____

Number of Months Years navigating the WWW _____

How would you rate your skill in navigating the WWW?

low				very high
1	2	3	4	5

How would you rate your experience using electronic sources of Federal Government Information?

low				very high
1	2	3	4	5

How would you rate your experience evaluating the design of websites?

low				very high
1	2	3	4	5

How would you rate your experience evaluating the content of websites?

low				very high
1	2	3	4	5

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2. G. ASSESSMENT CRITERIA (USED)

CONTENT

A. Quality Issues	**Poor**				**Excellent**
1. To what extent is the content balanced or unbiased?	1	2	3	4	5
2. To what extent does the content fulfill your needs or interests?	1	2	3	4	5
3. To what extent does the site provide in-depth information?	1	2	3	4	5
4. Rate the overall quality of the site	1	2	3	4	5
5. I would recommend this site to a colleague.	1	2	3	4	5
6. To what extent do you trust the information at this site?	1	2	3	4	5

B. Usefulness Issues	**Disagree**				**Agree**
1. The content of the site matched my expectations.	1	2	3	4	5
2. The site clearly indicated its scope and content.	1	2	3	4	5
3. The site clearly described its services and information.	1	2	3	4	5
4. The site organized its information in a way that was easy for me to understand.	1	2	3	4	5
5. Using this site would enable me to accomplish my desired tasks more quickly.	1	2	3	4	5
6. The site provided the precise information I needed.	1	2	3	4	5
7. The information on the site was relevant to me.	1	2	3	4	5
8. I understand the purpose of this site	1	2	3	4	5

EASE OF USE

A. Presentation Issues	**Poor**				**Excellent**
1. To what extent are the headers understandable?	1	2	3	4	5
2. To what extent do the headers accurately reflect the content they describe?	1	2	3	4	5
3. Rate the overall site design	1	2	3	4	5
	Not At All				**A Great Deal**
4. To what extent is the design consistent throughout the site?	1	2	3	4	5
5. To what extent is the use of graphics appropriate for the site?	1	2	3	4	5
6. To what extent are any of the design elements distracting?	1	2	3	4	5

B. Navigation Issues	**Disagree**				**Agree**
1. The graphics helped me find my way around the site	1	2	3	4	5
2. It was easy to move to where I wanted to go.	1	2	3	4	5
3. It is easy to understand what the navigation icons mean	1	2	3	4	5
4. It is easy to find what I want at this site.	1	2	3	4	5

C. General	**Disagree**				**Agree**
1. It would be easy for me to become skillful at using this site.	1	2	3	4	5
2. The site was easy to use.	1	2	3	4	5
3. Teaching a beginner to use this site would be easy.	1	2	3	4	5
4. It was easy to provide feedback to this site	1	2	3	4	5

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2. H. ASSESSMENT CRITERIA (REVISED)

CONTENT

A. Quality Issues	**Poor**				**Excellent**	**N/A**
1. To what extent did the site present different types or sources of information about your topic, thereby avoiding bias?	1	2	3	4	5	
2. To what extent does the content fulfill your needs?	1	2	3	4	5	
3. To what extent does the site provide in-depth information?	1	2	3	4	5	
4. Rate the overall quality of the site	1	2	3	4	5	
5. I would recommend this site to a colleague.	1	2	3	4	5	
6. To what extent do you think the information provided by this site is true or correct?	1	2	3	4	5	
7. To what extent does information quality vary within the site?						

B. Usefulness Issues	**Disagree**				**Agree**	**N/A**
1. The content of the site matched my expectations.	1	2	3	4	5	
2. The site clearly indicated its scope and content.	1	2	3	4	5	
3. The site clearly described its services and information.	1	2	3	4	5	
4. The site organized its information in a way that was easy for me to understand.	1	2	3	4	5	
5. Using this site would enable me to accomplish my desired tasks more quickly.	1	2	3	4	5	
6. The site provided the precise information I needed.	1	2	3	4	5	
7. The information on the site was relevant to me.	1	2	3	4	5	
8. I understand the purpose of this site	1	2	3	4	5	

C. General Questions

1. What aspect of the site did you like the most?

2. What aspect of the site did you like the least?

3. Please make one suggestion for improving the website.

EASE OF USE

A. Presentation Issues	**Poor**				**Excellent**	**N/A**
1. To what extent are the text headers understandable?	1	2	3	4	5	
2. To what extent do the headers accurately reflect the content they describe?	1	2	3	4	5	
3. Rate the overall site design	1	2	3	4	5	
4. To what degree was the information at the site located where indicated by the headers?	1	2	3	4	5	
	Not At All				**Great Deal**	**N/A**
5. To what extent is the design consistent throughout the site?	1	2	3	4	5	
6. To what extent is the use of graphics appropriate for the site?	1	2	3	4	5	
7. To what extent are any of the visual elements distracting?	1	2	3	4	5	

B. Navigation Issues	**Disagree**				**Agree**	**N/A**
1. The graphics helped me find my way around the site.	1	2	3	4	5	
2. It was easy to move to where I wanted to go.	1	2	3	4	5	
3. It is easy to understand what the navigation icons mean.	1	2	3	4	5	
4. It is easy to find what I want without using a search engine.	1	2	3	4	5	
5. Chance played a big part in my finding the information I wanted.						

C. General	**Disagree**				**Agree**	**N/A**
1. It would be easy for me to become skillful at using this site.	1	2	3	4	5	
2. The site was easy to use.	1	2	3	4	5	
3. Teaching a beginner to use this site would be easy.	1	2	3	4	5	
4. It was easy to provide feedback to this site	1	2	3	4	5	

2. I. FOCUS GROUP PROBES

What constitutes good navigability?

How legitimate is the information on federal websites?

How are searching skills in Web environments different from search engines?

Do you feel that you are able to tell whether something you did or did not like was due to the website, the browser, the local network, *etc.*?

Are there criteria we should have included but did not?

Are there criteria that seemed inappropriate or unclear?

Were you comfortable with the Think Aloud technique?

How did being videotaped and observed affect your assessment?

Did you feel that your interest (situatedness) in the site's content affected your assessment?

Was the website you assessed better than, worse than, or about what you expected?

Is method useful to agencies?

Are criteria transferable to other sites?

Is sample appropriate?

3. DESIGN-BASED ASSESSMENTS

A. Technical Assessment Criteria -- Summary Of All Four Websites*
B. Technical Assessment Criteria -- NIH Website
C. Technical Assessment Criteria -- NARA Website
D. Technical Assessment Criteria -- Stat-USA Website
E. Policy Assessment Criteria -- Summary Of All Four Websites
F. Policy Assessment Criteria -- NIH Website
G. Policy Assessment Criteria -- NARA Website
H. Policy Assessment Criteria -- Stat-USA Website

3. A. TECHNICAL ASSESSMENT CRITERIA -- Summary of All Four Websites*

Technical Criteria	Census[1]	NIH[2]	NARA[3]	STAT-USA
Content: Quality Issues				
1. Do hyperlink headings and descriptions match the information found through the hotlinks?	5	5	5	3
Usefulness Issues				
1. Are descriptions given to further describe the headers?	1	3	3	3
2. Are services offered on the site?	4	0	5	5
3. Are the services functional?	4	0	4	5
Currency Issues				
1. Does the website include dates indicating when pages were last updated?	5	0	4	5
2. How long since the last update?	10/01/96-02/12/97	Not provided	09/13/96 01/15/97	10/04/96 02/06/97
Ease of Use/Presentation Issues				
1. Are the banners consistently designed?	5	5	4	5
2. Are the banners consistently placed?	5	5	4	5
3. Are the navigation bars consistently designed?	2	5	3	5
4. Are the navigation bars consistently placed?	2	5	3	5
Navigation Issues				
1. Do hotlinks connect to gopher menus?	1	2	2	0
2. Is any of the site restricted by passwords?	0	0	0	3
3. Is the page longer than three screens?	1	2	3	0
4. Do pages longer than three screens provide anchors?	0	0	0	0
5. Does the site consistently differentiate between graphics and graphical links?	3	0	0	2
6. Does the site have a consistent way of indicating text and graphical hotlinks?	2	3	5	5
7. Do you need to use the browser to navigate?	0	0	1	0
8. Does each page provide an indication of where you are in the site?	5	5	5	5
9. Does each page indicate what site you are on?	5	5	4	5
10. Does the site warn you when you take an outside link?	0	0	0	0

Help Issues

1. Is there a person or address that can be reached to provide feedback or to ask questions?	2	5	5	5
2. Are large documents broken up into subsections?	2	0	0	1
3. Are indexes provided for large documents and subsections?	1	0	0	0
4. Does the site provide a download option for large documents?	1	0	0	0
5. Does the site warn you about file sizes?	1	0	1	0
6. Is a text only version of the site available?	1	0	0	1

1. United States Census Bureau <http://www.census.gov>
2. National Institutes of Health <http://www.nih.gov>
3. National Archives and Records Administration <http://www.nara.gov>
4. Department of Commerce <http://www.stat-usa.gov>

* The numbers 0 - 5 indicate the number of "YES" responses for each website, based on five webpages per each of the four websites assessed. Note that a zer does not necessarily mean "NO"; it could also indicate that the question is not applicable to a particular page. Refer to the detailed assessments for individual websites provided below.

3. B. TECHNICAL ASSESSMENT CRITERIA -- NIH Website

Technical Criteria	Page I[1]	Page II[2]	Page III[3]	Page IV[4]	Page V
Content: Quality Issues					
1. Do hyperlink headings and descriptions match the information found through the hotlinks?	Y	Y	Y	Y	Y
Usefulness Issues					
1. Are descriptions given to further describe the headers?	Y	Y	Y	N	N
2. Are services offered on the site?	N	N	N	N	N
3. Are the services functional?	N/A	N/A	N/A	N/A	N/A
Currency Issues					
1. Does the website include dates indicating when pages were last updated?	N	N	N	N	N
2. How long since the last update?	N/A	N/A	N/A	N/A	N/A
Ease of Use/Presentation Issues					
1. Are the banners consistently designed?	Y[6]	Y[6]	Y[6]	Y[6]	Y[6]
2. Are the banners consistently placed?	Y[6]	Y[6]	Y[6]	Y[6]	Y[6]
3. Are the navigation bars consistently designed?	Y[7]	Y[7]	Y[7]	Y[7]	Y[7]
4. Are the navigation bars consistently placed?	Y[7]	Y[7]	Y[7]	Y[7]	Y[7]
Navigation Issues					
1. Do hotlinks connect to gopher menus?	N	N	Y	Y	N
2. Is any of the site restricted by passwords?	N	N	N	N	N
3. Is the page longer than three screens?	N	Y	Y	N	N
4. Do pages longer than three screens provide anchors?	N/A	N	N	N/A	N/A
5. Does the site consistently differentiate between graphics and graphical links?	N[8]	N[8]	N[8]	N[8]	N[8]
6. Does the site have a consistent way of indicating text and graphical hotlinks?	Y	Y	Y	N[10]	N[10]
7. Do you need to use the browser to navigate?	N	N	N	N	N
8. Does each page provide an indication of where you are in the site?	Y	Y	Y	Y	Y
9. Does each page indicate what site you are on?	Y	Y	Y	Y	Y
10. Does the site warn you when you take an outside link?	N/A	N[9]	N[9]	N	N[11]

Help Issues

1.	Is there a person or address that can be reached to provide feedback or to ask questions?	Y	Y	Y	Y	Y
2.	Are large documents broken up into subsections?	N/A	N/A	N/A	N/A	N/A
3.	Are indexes provided for large documents and subsections?	N/A	N/A	N/A	N/A	N/A
4.	Does the site provide a download option for large documents?	N/A	N/A	N/A	N/A	N/A
5.	Does the site warn you about file sizes?	N/A	N/A	N/A	N/A	N/A
6.	Is a text only version of the site available?	N	N	N	N	N

1. National Institute of Health (NIH) -- Homepage <http://www.nih.gov>
2. National Institute of Health -- What's New <http://www.nih.gov/whatsnew.html>
3. National Institute of Health -- Health Information Index <http://www.nih.gov/health/>
4. National Institute of Health -- Scientific Resources <http://www.nih.gov/science/>
5. National Institute of Health -- Institutes, Centers, and Divisions <http://www.nih.gov/icd/>
6. Banners were consistently designed and placed on the five pages assessed.
7. The navigation bar is a list of the different sections of the site along the bottom of the page and is consistently placed.
8. Of the five pages assessed there is consistency among graphics and graphical links.
9. Indirectly in the description of the links there is mention of another site, but it is not clearly stated that the links are to other sites.
10. This page is a list of many links with no further explanation about them. This is inconsistent with the other pages assessed.
11. This page is a list of links to many institutes and centers with no indication that the links are to other site except indirectly in the name of the links.

3. C. TECHNICAL ASSESSMENT CRITERIA -- NARA Website

Technical Criteria	Page I[1]	Page II[2]	Page III[3]	Page IV[4]	Page V
Content: Quality Issues					
1. Do hyperlink headings and descriptions match the information found through the hotlinks?	Y	Y	Y	Y	Y
Usefulness Issues					
1. Are descriptions given to further describe the headers?	N[6]	N	Y	Y	N
2. Are services offered on the site?	Y[7]	Y	Y	N	Y
3. Are the services functional?	Y	Y	Y	N/A	Y
Currency Issues					
1. Does the website include dates indicating when pages were last updated?	Y	Y	Y	N/A[8]	Y
2. How long since the last update?	01/15/97	09/13/96	01/06/97	- - - - -	10/07/9
Ease of Use/Presentation Issues					
1. Are the banners consistently designed?	Y[9]	Y	Y	N[10]	Y
2. Are the banners consistently placed?	Y	Y	Y	N/A	Y
3. Are the navigation bars consistently designed?	N/A[11]	Y[12]	Y[12]	N[13]	Y[12]
4. Are the navigation bars consistently placed?	N/A	Y	Y	N/A	Y
Navigation Issues					
1. Do hotlinks connect to gopher menus?	Y	Y	N	N	N
2. Is any of the site restricted by passwords?	N	N	N	N	N
3. Is the page longer than three screens?	Y	N	Y	Y	N
4. Do pages longer than three screens provide anchors?	N	N/A	N	N	N/A
5. Does the site consistently differentiate between graphics and graphical links?	N[14]	N[14]	N[14]	N[14]	N[14]
6. Does the site have a consistent way of indicating text and graphical hotlinks?	Y	Y	Y	Y	Y
7. Do you need to use the browser to navigate?	N/A[15]	N[16]	N[16]	Y	N[16]
8. Does each page provide an indication of where you are in the site?	Y	Y	Y	Y	Y
9. Does each page indicate what site you are on?	Y	Y	Y	N[17]	Y
10. Does the site warn you when you take an outside link?	N/A	N/A	N/A	N/A	N/A

Help Issues

1. Is there a person or address that can be reached to provide feedback or to ask questions?	Y[15]	Y	Y	Y	Y
2. Are large documents broken up into subsections?	N/A	N/A	N/A	N/A	N/A
3. Are indexes provided for large documents and subsections?	N/A	N/A	N/A	N/A	N/A
4. Does the site provide a download option for large documents?	N	N	N	N	N
5. Does the site warn you about file sizes?	N	N	N	Y	N
6. Is a text only version of the site available?	N	N	N	N	N/A

1. Homepage <http://www.nara.gov>
2. What's New at NARA <http://www.gov/nara/whatsnew.html>
3. The Digital Classroom <http://www.nara.gov/nara/digital/classroom.html>>
4. The Japanese Surrender Document <http://www.nara.gov/exhall/wwii/surrender.html>
5. NARA and the Public <http://www.nara.gov/nara/whatis/public.html>
6. Varies throughout page
7. The site itself is a service?
8. This page will always remain the same
9. Homepage has unique banner; -- 10. No banner at top of page; -- 11. No navigation of any kind
12. Home button at bottom left; -- 13. No home button at bottom left; -- 14. No distinct differences on page; -- 15. Evaluation of one page only
16. Pages had home button at bottom left' -- 17. No header at top of page; -- 18. Link reads, "Questions, Comments, or Complaints"

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3. D. TECHNICAL ASSESSMENT CRITERIA -- Stat-USA Website

Technical Criteria	Page I[1]	Page II[2]	Page III[3]	Page IV[4]	Page V
Content: Quality Issues					
1. Do hyperlink headings and descriptions match the information found through the hotlinks?	N[6]	Y	Y	N[7]	Y
Usefulness Issues					
1. Are descriptions given to further describe the headers?	N	Y	Y	N[8]	N
2. Are services offered on the site?	Y[9]	Y	Y	Y	Y
3. Are the services functional?	Y[10]	Y[10]	Y[10]	Y[10]	Y[10]
Currency Issues					
1. Does the website include dates indicating when pages were last updated?	Y	Y	Y	Y	Y
2. How long since the last update?	12/06/96	10/04/96	10/09/96	02/06/97	01/07/9
Ease of Use/Presentation Issues					
1. Are the banners consistently designed?	Y	Y	Y	Y	Y
2. Are the banners consistently placed?	Y	Y	Y	Y	Y
3. Are the navigation bars consistently designed?	Y[11]	Y[11]	Y	Y	Y
4. Are the navigation bars consistently placed?	Y	Y	Y	Y	Y
Navigation Issues					
1. Do hotlinks connect to gopher menus?	N	N	N	N	N
2. Is any of the site restricted by passwords?	Y	Y	Y	N	N
3. Is the page longer than three screens?	N	N	N	N	N
4. Do pages longer than three screens provide anchors?	N/A	N/A	N/A	N/A	N/A
5. Does the site consistently differentiate between graphics and graphical links?	N[12]	Y	Y	N	N
6. Does the site have a consistent way of indicating text and graphical hotlinks?	Y	Y	Y	Y	Y
7. Do you need to use the browser to navigate?	N[13]	N[13]	N[13]	N[13]	N[13]
8. Does each page provide an indication of where you are in the site?	Y	Y	Y	Y	Y
9. Does each page indicate what site you are on?	Y	Y	Y	Y	Y
10. Does the site warn you when you take an outside link?	N	N	N	N	N

Help Issues

1. Is there a person or address that can be reached to provide feedback or to ask questions?	Y[14]	Y[14]	Y[14]	Y[14]	Y[14]
2. Are large documents broken up into subsections?	N/A	N/A	N/A	N/A	Y
3. Are indexes provided for large documents and subsections?	N/A	N/A	N/A	N/A	N
4. Does the site provide a download option for large documents?	N	N	N	N[15]	N[15]
5. Does the site warn you about file sizes?	N	N	N	N	N
6. Is a text only version of the site available?	Y[16]	N[17]	N[17]	N[17]	N[17]

1. Homepage <http://www.stat-usa.gov/stat-usa.html>
2. STAT-USA Databases <http://www.stat-usa.gov/BEN/databases.html>
3. Business Leads & Procurement Opportunities <http://www.stat-usa.gov/BEN/subject/pocure.html>
4. Selected Publications of Interest <http://www.stat-usa.gov/BEN/publications.html>
5. ESA Research Series Selected Reports <http://www.stat-usa.gov/BEN/esadocs/esadocs.html>
6. Index takes you to databases
7. Two different titled links go to same page
8. All links with no descriptions; -- 9. The site itself is a service; -- 10. In some cases a password is needed
11. The background color changes; -- 12. The "Newsletter" switches to frames; -- 13. Evaluation was of individual page only.
14. Pages only offer an address which is not hyperlinked, no person's name; - 15. Some links automatically download documents without warning.
16. It offers a "mostly text version", -- 17. This function may only be appropriate from homepage?

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3. E. POLICY ASSESSMENT CRITERIA -- Summary of All Four Websites

Policy Criteria	Census[1]	NIH[2]	NARA[3]	STAT-USA
1. Does the website provide an e-mail link to a Web administrator?	0	0	5	0
2. Does the site offer users the opportunity to make comments about the site's content or design?	2	5	4	5
3. Is there indication that visitors should expect responses to their comments?	0	5	0	0
4. Is there a notice of when the website or specific pages were last updated?	5	0	5	5
5. Does content appear appropriate for public access?	5	5	5	2
6. Does content appear appropriate for the agency's mission?	5	5	5	5
7. Does content appear to advocate political positions?	0[5]	0	0	0
8. Do external links to commercial sites exist?	2	0	4	1
9. How appropriate do links to commercial site seem?	2	0	1	0
10. Are any data collection mechanisms included on the site?	0	0	0	0
11. Do they appear appropriate in terms of the agency's mission?	0	0	0	0
12. Does the website provide pointers to alternative means of accessing the content (telephone numbers for ordering paper copies)?	0	0	0	0
13. Are the location aids GILS compliant?	0	0	0	0

1. United States Census Bureau <http://www.census.gov>
2. National Institutes of Health <http://www.nih.gov>
3. National Archives and Records Administration <http://www.nara.gov>
4. Department of Commerce <http://www.stat-usa.gov>
5. Page discussed implication of budget limitations on provision of service. Issue discussed in text.

3. F. POLICY ASSESSMENT CRITERIA -- NIH Website

Policy Criteria	Page I[1]	Page II[2]	Page III[3]	Page IV[4]	Page V
1. Does the website provide an e-mail link to a web administrator?	N	N	N	N	N
2. Does the site offer users the opportunity to make comments about the site's content or design?	Y	Y	Y	Y	Y
3. Is there indication that visitors should expect responses to their comments?	Y	Y	Y	Y	Y
4. Is there a notice of when the website or specific pages were last updated?	N	N	N	N	N
5. Does content appear appropriate for public access?	Y	Y	Y	Y	Y
6. Does content appear appropriate for the agency's mission?	Y	Y	Y	Y	Y
7. Does content appear to advocate political positions?	N	N	N	N	N
8. Do external links to commercial sites exist?	N	N	N	N	N
9. How appropriate do links to commercial site seem?	N/A	N/A	N/A	N/A	N/A
10. Are any data collection mechanisms included on the site?	N	N	N	N	N
11. Do they appear appropriate in terms of the agency's mission?	N/A	N/A	N/A	N/A	N/A
12. Does the website provide pointers to alternative means of accessing the content (telephone numbers for ordering paper copies)?	N	N	N	N	N
13. Are the location aids GILS compliant?	N/A	N/A	N/A	N/A	N/A

1 National Institute of Health (NIH) -- Homepage <http://www.nih.gov>
2 National Institute of Health -- What's New <http://www.nih.gov/whatsnew.html>
3 National Institute of Health -- Health Information Index <http://www.nih.gov/health/>
4 National Institute of Health -- Scientific Resources <http://www.nih.gov/science/>
5 National Institute of Health -- Institutes, Centers, and Divisions <http://www.nih.gov/icd/>

3. G. POLICY ASSESSMENT CRITERIA -- NARA Website

Policy Criteria	Page I[1]	Page II[2]	Page III[3]	Page IV[4]	Page V
1. Does the website provide an e-mail link to a web administrator?	Y	Y	Y	Y	Y
2. Does the site offer users the opportunity to make comments about the site's content or design?	Y[6]	N[7]	N[7]	N[7]	N[7]
3. Is there indication that visitors should expect responses to their comments?	N	N	N	N	N
4. Is there a notice of when the website or specific pages were last updated?	Y	Y	Y	Y	Y
5. Does content appear appropriate for public access?	Y	Y	Y	Y	Y
6. Does content appear appropriate for the agency's mission?	Y	Y	Y	Y	Y
7. Does content appear to advocate political positions?	N	N	N	N	N
8. Do external links to commercial sites exist?	N	N	N	N	Y
9. How appropriate do links to commercial site seem?	N/A	N/A	N/A	N/A	Y[8]
10. Are any data collection mechanisms included on the site?	N/A	N/A	N/A	N/A	N/A
11. Do they appear appropriate in terms of the agency's mission?	N/A	N/A	N/A	N/A	N/A
12. Does the website provide pointers to alternative means of accessing the content (telephone numbers for ordering paper copies)?	N	N	N	N	N
13. Are the location aids GILS compliant?	N/A	N/A	N/A	N/A	N/A

1. Homepage <http://www.nara.gov>
2. What's New at NARA <http://www.gov/nara/whatsnew.html>
3. The Digital Classroom <http://www.nara.gov/nara/digital/classroom.html>>
4. The Japanese Surrender Document <http://www.nara.gov/exhall/wwii/surrender.html>
5. NARA and the Public <http://www.nara.gov/nara/whatis/public.html>
6. Yes, offers a link for "Questions, Comments, or Complaints"
7. Link changed to e-mail only
8. Yes here indicates appropriate

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3. H. POLICY ASSESSMENT CRITERIA -- Stat-USA Website

Policy Criteria	Page I[1]	Page II[2]	Page III[3]	Page IV[4]	Page V
1. Does the website provide an e-mail link to a Web administrator?	N	N	N	N	N
2. Does the site offer users the opportunity to make comments about the site's content or design?	Y[6]	Y[6]	Y[6]	Y[6]	Y[6]
3. Is there indication that visitors should expect responses to their comments?	N	N	N	N	N
4. Is there a notice of when the website or specific pages were last updated?	Y	Y	Y	Y	Y
5. Does content appear appropriate for public access?	N[7]	N[7]	N[7]	Y	Y
6. Does content appear appropriate for the agency's mission?	Y	Y	Y	Y	Y
7. Does content appear to advocate political positions?	N	N	N	N	N
8. Do external links to commercial sites exist?	Y[8]	N	N	N	N
9. How appropriate do links to commercial site seem?	N/A	N/A	N/A	N/A	N/A
10. Are any data collection mechanisms included on the site?	N/A	N/A	N/A	N/A	N/A
11. Do they appear appropriate in terms of the agency's mission?	N/A	N/A	N/A	N/A	N/A
12. Does the website provide pointers to alternative means of accessing the content (telephone numbers for ordering paper copies)?	N	N	N	N	N
13. Are the location aids GILS compliant?	N/A	N/A	N/A	N/A	N/A

1. Homepage <http://www.stat-usa.gov/stat-usa.html>
2. STAT-USA Databases <http://www.stat-usa.gov/BEN/databases.html>
3. Business Leads & Procurement Opportunities <http://www.stat-usa.gov/BEN/subject/pocure.html>
4. Selected Publications of Interest <http://www.stat-usa.gov/BEN/publications.html>
5. ESA Research Series Selected Reports <http://www.stat-usa.gov/BEN/esadocs/esadocs.html>
6. You can mail general comments, but not about a particular page
7. Many of the links require a password
8. "Other Products" links to other sites

4. DEVELOPER-BASED ASSESSMENT (SITE VISIT)

A. Probes
B. Website Administrators' Responses To Survey
C. Transcript Of Videotape Of Stat-USA Situated Assessments

4. A. PROBES

1. Stat-USA
02/21/1997

Study Team members: Dr. Charles McClure Steven Wyman
John Beachboard Kevin Bontenbal

Here are general topics we hope to explore during the site visit:

Topic 1: Planning and Developing the Website

- What led you to establish a website?
- How did you decide upon the overall format of you website?
- Did you model it after other websites?
- Were there any criteria you used to determine its format?
- Are different sections based on different criteria?
- Did you find any resistance or enthusiasm for the idea?
- Did it require a "champion" to bring together?
- Who did you expect your audience to be?
- Do you view the website as offering one type of "content" service or multiple services?

Topic 2: User Profiles and Concerns

- Did you construct your website and do you maintain it with specific users in mind?
- Are certain sections designed to meet the needs of particular users?
- Are you concerned about the universality (use) of your website?
- Are you concerned about how others might use your website?
- How or to what degree do you coordinate with site users?
- Feedback from the website --
  1. Focus groups/interviews?
  2. What means do you currently employ to gain feedback about your website?
  3. How do you evaluate it?

Topic 3: Data Sources and Value Added (Proprietary) Issues

- Do you present data from federal data sources other than Dept of Commerce?
- If so, do any of these express ownership concerns and control of the data presentation?
- Do your content providers post information independently or does the site Web administrator perform quality assurance?
- What mechanisms do content providers (or the Web administrator) use to ensure the reliability of the data?

Topic 4: Data and Technical Formats

- Has consideration been given to modifying content to take more a advantage of Web technology?
- Graphic presentation of content?
- Specifically authoring documents for Web display?
- Increased use of hyperlinks?
- Have there been problems with commercial information providers complaining that you are infringing on their turf?
- Are you "adding values" to the information presented through Stat-USA?

Topic 5: Costing

- How do you determine the cost of your services?
- Does pricing differ between the data derived from Dept of Commerce sources, and data coming from external information providers?
- Are there any pricing tiers to distinguish users by volume, frequency of access, institutional vs. individuals?
- How does the billing procedure work -- is there a deposit system?
- How much time do you spend at cost accounting?

Topic 6: Usability

- Are you concerned about your website having a consistent presentation for all users?
- How has the operation of the Stat-USA website affected your work? Other agency personnel?
- The situated assessment indicated that the following areas could improve:

  1. The Help system is imprecise, and takes some interpretation to use
  2. Tabular data often lacks headings, or goes on for many screens without breaks or headers
  3. The site overall is not very thoroughly hyperlinked -- it seems more like a shell of HTML with a lot of secondary level data dumped in.

Topic 7: Policy Issues

- What actions are taken to ensure compliance with GILS policies?
- Information resource or service formats -- e.g., metadata records?
- Technical interoperabilities, such as Z39.50 or WAIS?
- Any interagency agreements, efforts, at standardization?
- Are you making any attempt to follow particular federal IT or information policy guidelines?
- Data collection via the Web (PRA implications)?
- What policies have helped or hindered the development of the Stat-USA website?
- What policies would you like to see in place regarding federal websites?

Topic 8: Lessons Learned and Future Directions

- What do you feel are critical factors leading to the success of your website?
- What do you feel is the best balance of technical / organizational / interpersonal skills or expertise needed to develop and operate a complex website?
- If you had all the staff and resources you wanted, what ideally, would you like to do with Stat-USA?
- What are particular problems in running Stat-USA? Any surprises?
- What is next for Stat-USA?

4. B. WEBSITE ADMINISTRATORS' RESPONSES TO SURVEY

A. Project Administrator. Years in civil service: 24
B. Chief Financial Officer Years: 24
C. Economist Years: 6
D. Computer Systems Programmer Years: 18
E. Economist Years: 5
F. Economist Years: 3.5

---

1. Please rate your duties as related to the planning, development or operation of the STAT-USA website.

A. Clearing away obstacles that hinder staff from doing work, and motivating them to perform at their fullest.

B. Pricing, accounting, budget policy

C. Initial developer/designer of website. Now less involved in operations, but developing newer site. Have "corporate knowledge" of search engine.

D. Involved in customer support, billing, notification of passwords, *etc.*

E. Involved in day to day management of site. Responsible for timely update of information on site.

F. Will be one of main editors of the new site (April 8th) - putting together the front page of STAT-USA to customers and ensuring their return on a daily basis.

---

2. Number of years navigating the WWW.

A. 3
B. 3
C. 3.5
D. 3
E. 3
F. 2.5

---

3. [On a scale of 1-5 with 5 being highest] How would you rate your skill in navigating the WWW?

A. 4
B. 5
C. 5
D. 4
E. 5
F. 4

4. Please list what you perceive as being the three biggest strengths of the STAT-USA website.

A. 1. Focused
   2. Dynamic -- keeping up to date
   3. Acting as a business

B. Competition for federal sites

C. 1. Data (content)
   2. Data!
   3. Data!

D. 1. Official distribution site for several agencies
   2. Reasonably easy to find what you're after if you are familiar with it
   3. Straightforward interface

E. 1. Wealth of economic and trade-related information
   2. Timeliness of updates and releases
   3. One-stop shop for information from 40 government agencies

F. 1. Data
   2. Reliability / timeliness
   3. Relationships with other agencies

---

5. Please list the three main barriers you perceive as limiting the effectiveness or quality of the STAT-USA website.

A. 1. Staff stretched too thin
   2. Keeping data current and relevant
   3. The huge variety of data, formats, concepts, *etc.*

B. None provided

C. 1. UNIX platform vs. NT
   2. Staff resources devoted to website
   3. Customer service responsibility (having to answer calls)

D. 1. Inability to quickly find information
   2. Variety of data formats
   3. Lack of technical expertise about the data themselves

E. 1. Formatting of data from supplying agency
   2. Amount of information
   3. Informing users how to search and use site

F. 1. Lack of control (searching, *etc.*) on the part of the user
   2. Lack of bird's eye view for navigation
   3. Lack of guidance for the exporter to know exactly why he should go to what information and why

4. C. TRANSCRIPT OF VIDEOTAPE OF STAT-USA SITUATED ASSESSMENTS

Transcription of STAT-USA Video

USER #1

Initial thoughts are that it is laid out pretty well on the first page.

Pretty good navigational bar on the side.

So, I'm just going to go to something else, "Test Drive".

This right here is not good.

Basically it took us to another page, it looks like, so that doesn't have much to do with their site.

But, what their doing is keeping a consistent feel throughout the whole thing with the same navigation bar along the way so you know exactly where you are.

One thing that they don't do which I can see right off the top is when you're actually on a page that you clicked off the navigation bar their not taking that out of the list so you can keep hitting the same button of the page you are already on which can be a little confusing for brand new users.

On thing I noticing on this page, when you first look at the page, besides the date that's all you really see, so you don't really know exactly what it's about just as a glance looking through it.

So, my first notion is what exactly does this page contain without sitting and reading every single date, especially some of these long drawn out dates. My first thought is I'm gonna get frustrated and move on -- it's too wordy.

And, the maps are doing something strange, and we also lost the tool bar on the side.

It seems like this whole portion, just clicking on some of these is the same.

[And there's nothing on the screen saying these documents aren't done loading?] -- No.

Yeah, there done loading. They are all pushed off to the side, we've lost the tool bar, O.K. The map is just all whacked right here.

[I'm gonna ask you to click on one of those buttons to see if its, O.K. I thought maybe.]

Actually what it did was brought us back to the home page, it's not taking us anywhere different. So the maps aren't working right.

Which would be helpful for the pages which don't work and the ones that don't have this navigational tool bar on the side, there's no way to leave comments about a particular page, this is just gonna mail about the site, it's not gonna let you give feedback on either different areas of the site, certain page of the site, so I don't think they are getting accurate feedback.

I'm not sure exactly, it seems to be the same format throughout but, I wondering why they are changing the color on certain things.

It doesn't seem like they have any kind of value other than to maybe break up the monotony. In some case that's not so good.

Let me try that again. This is supposed to be the help. This to me is cumbersome help. It doesn't really, I'm not sure if this is help with the site, I guess I'm not sure what this help is doing. Is it helping you search through the site or navigate through the site or what. It doesn't give you, it doesn't tell you anything. Actually this isn't even their help, this isn't even help for their site, this is a different site and this is help on stats, so that's that certainly not gonna help.

Yeah, this help has noting to do with the site, it has to do with only statistics.

USER #2

Chose an index. Product. Oh, this is hard to read, this box is not clear with the rest of the graphic.

Oh, boy. Who uses this thing, U.S. imports by commodity, alright let's try that one, choose an index. Lets see, location. This thing is just too, I need a little bit more instruction on exactly what they want here. I've never used one like this before.

There not telling me, what are they telling me.

This is miserable, look at how long it is taking me to scroll down this page. I hate it when you have a page that is this long and you have to scroll down. There is no table of contents, there is nothing clickable so that you could. I mean you could easily wire this all up so that you could click on "H" or "Hardware Stores" or even "Table 2 Estimated Monthly Retail Sales for Specified States." It would be nice to get at that so I could go to hardware stores in Missouri, if that is what I was after. It's just not very useful.

Gees, Well someone made a web page out of this but it seems that what's underneath is just sort of a core dump of what ever documents they had on hand. They didn't work very hard to present it. It's as if it's on a very basic level of indexing which is O.K. on this level but they need to do the next level down.

The great lakes, I wonder what that means? My god, what the heck is this and who the hell could use it. This is totally useless, there isn't even a title at the top of the page. This is really bad, look at this.

USER #3

I like how the initial page is all on one screen, I don't have to page down and all, so it seems concisely organized, at least at this point.

I was wondering what these most popular pages are. It's a search engine but I might not know that, it says "search here" but it might be better if they just said search up here. That seems sort of odd.

I'm wondering what's going here, I guess it's still loading.

If this is gonna take a while I might want, it might have been better to have these on separate pages. If I only want this sort of general information at the top or for larger industries, I might not want to wait for all of this more detail to finish loading.

5. PROJECT URLS

A. Project Website
B. Project Abstract

5. A. **PROJECT WEBSITE** <http://istweb.syr.edu/Project/Faculty/fedweb.html>

Quality Criteria for Evaluating Information Resources and Services Available from Federal Websites Based on User Feedback

• (Resources List)

TABLE OF CONTENTS

Project Abstract

Federal Websites

Guidelines -- Criteria -- Development

Other Websites

Guidelines -- Criteria -- Development

Log Analysis Tools

HTML Style Guides and Standards

World Wide Web Statistics

World Wide Web Security

Accessibility to Users with Disabilities

Miscellaneous

Department of Commerce - STAT-USA
http://www.stat-usa.gov/stat-usa.html

•• **National Institutes of Health•**
http://www.nih.gov

• **Census Bureau**
http://www.census.gov

National Archives and Records Administration
http://www.nara.gov

FEDERAL WEBSITE GUIDELINES

NCSA/NSF World-Wide Web Federal Consortium World Wide Web Home Page Guidelines (May 6, 1995)

URL: http://skydive.ncsa.uiuc.edu/consortium/guide/hmpggl.htm

This guidance is posted for all federal agencies to use in developing quality and consistent websites. It covers the various elements of what makes a good website and has a nice summary homepage checklist. It also includes brief mention of other points webmasters should consider when managing their websites. Most notable is a concise and thorough discussion of copyright basics.

National Institutes of Health World Wide Web NIH Guidance (1995)
URL: http://www.nih.gov/od/oirm/guideli2.html

This document lays out a slightly different method of website coordination and content approval. It also has an informative section on security and examples of good security practices. The appendix includes examples of warning notices and disclaimer statements.

U.S. Department of Education WWW Server Standards and Guidelines
URL: http://inet.ed.gov/~kstubbs/wwwstds.html

This document was used as a basis for the NCSA/NSF guidelines, as well as profiled at webmaster workshops. The style/markup section includes more in-depth information on what managers should consider. There is also a section on 'ED-specific Issues' which other agencies may find is a useful template to follow when identifying their specific web issues.

Marshall Space Flight Center - National Aeronautics and Space Administration (1995) MSFC Guidelines for Administering World-Web Fesources
URL: http://www.msfc.nasa.gov/webmasters/policy/guidelines.html

This document has a good example of a website mission statement in its introduction. MSFC guidance also covers the special case of disseminating scientific and technical information over the web. There is also good information concerning security.

DTIC WWW Sever Standards and Guidelines (Final Draft: 4/24/95)
URL: http://www.dtic.dla.mil/staff/trefzger/standards.html

FEDERAL WEBSITE CRITERIA

- **Ten tips for webmasters**
  URL: http://www.smartpages.com/worldlink/master.html

  This is a short list of important tips intended for web developers. These tips can be translated into evaluation criteria.

- **Policy for Internet Information Dissemination Using the World Wide Web (Draft: 8/9/94)**
  URL: http://banjo/cise-nsf.gov/cise/CISEWebPolicy.html

FEDERAL WEBSITE DEVELOPMENT

Department of Defense Guidelines for Establishing and Maintaining a Department of Defense Web

Information Service
URL: http://www.dtic.mil/defenselink/webguide.html

An excellent and concise treatment of not only web development, but of website management, including website security and relationship to GILS. This document provides a good example of how a parent agency can coordinate and structure website development among its sub-agencies and programs.

Department of Health and Human Services Use of the Internet
URL: http://www.os.dhhs.gov

This draft internal DHHS policy is a thorough treatment of website development, policies and management, including guidelines for DHHS Internet users. It is also notable for incorporating consideration of existing Federal policies into its guidance (see the document's reference section).

OTHER WEBSITE GUIDELINES

Kathy Schrock's Guide for Educators
URL: http://www.capecod.net/Wixon

This website has evaluation surveys for elementary, middle and high school levels. The surveys are geared toward the students with increasingly more complex surveys appearing at the high school level. There are no evaluation remarks to suggest good or bad website qualities.

Performance Measurements for Web Sites
URL: http://www.iqpc.com/pmweb.htm

Guidelines for Managing Electronic Documents in Australian Government Agencies
URL: http://www.nepean.uws.edu.au/library/LIBRES/IT/edg/edg1301.html

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OTHER WEBSITE CRITERIA

Web page design guidelines for public libraries
URL: http://www.tiac.net/users/mpl/guidelines.html

The focus of this document is on providing content criteria for website inclusion in the public library website. However, the checklist is brief and a good starting point for webmasters in all stages of web development who are evaluating their individual needs.

Library Selection Criteria for WWW Resources
URL: http://duckdock.acic.com/carolyn/criteria.htm

This website provides a basic list of evaluation criteria intended to guide library personnel in the selection of websites. While it is a brief listing, the criteria are relevant and address the most current technology. Links to other sites focusing on criteria are included as well.

Global Network Navigator (GNN) editorial staff (1996), Best of the net selection process
URL: http://www.gnn.com/gnn/wic/botn/process.html

GNN evaluates many different types of websites (corporate, school, etc.) in order to make nominations for its Best of the Net awards. This document provides the seven criteria GNN user in its evaluation of existing websites.

Evaluating Quality on the Net
URL: http://www.tiac.net/users/hope/findqual.html

The criteria is set up for those who are designing as well as those evaluating other sites. Some criteria is in the form of statements and some in the form of questions.

Thinking critically about world wide web resources
URL: http://www.ucla.edu/campus/computing/bruinonline/trainers/critical.html

This web document gives a list of library oriented evaluation criteria. This is a thorough checklist for evaluating existing websites.

OTHER WEBSITE DEVELOPMENT

Internet Business Network 7 Characteristics of a great website
URL: http://www.interbiznet.com/greatweb1.html

This document looks at web development from the for-profit perspective. It offers suggestions that can be used to evaluate all types of websites.

Evaluating World Wide Web Information
URL: http://thorplus.lib.purdue.edu/library_info/instruction/gs175/3gs175/evaluation.html

This website lists the essential components for web documents. The checklist addresses some of the most important points of web development. It includes a helpful graphic.

A World Wide Web Starter Kit
URL: http://www.ctg.albany.edu/projects/inettb/startkit.html

WebResults (1996)
URL: http://www.webresults.com

WebResults, a website development consulting firm for non-profit organizations, provides web developers with comprehensive information on web design. This information can be helpful for those with established webpages to review and reflect on the development as well as those in the formative stages. Additionally, their website is set up as an example of a quality website.

LOG ANALYSIS TOOLS

Log Analysis - A Brief Overview

URL: http://istweb.syr.edu/Project/Faculty/logs.html

Wusage 4.1: Usage Statistics System for Web Servers
URL: http://www.boutell.com/wusage/

This is Wusage, used on the AskERIC server, very simplistic. It is a free log tool.

WWWStat: HTTPd Logfile Analysis Software
URL: http://www.ics.uci.edu/pub/websoft/wwwstat

This is WWWstat, used on AskERIC and istweb, very detailed. It is a free log tool.

Analog: a WWWserver logfile analysis program
URL: http://www.statslab.cam.ac.uk/~sret1/analog

MKStats: Web Server Log Analysis Perl Script
URL: http://www.mkstats.com

Hyperreal's Web Server - Accesswatch Summary
URL: http://squishy.com/~pixel/accesswatch/

It appears to use the agent_log refer_log and access_log

Yahoo's listing of log analyis tools
URL:http://www.yahoo.com/Computers_and_Internet/Internet/World_Wide_Web/Servers/Log_Anal

Stout, Rick. (1997). Web Site Stats: Tracking Hits and Analyzing Traffic. Berkely, CA: Osborne/McGraw-Hill.

This is the only book on the market which deals with World Wide Statistics.

HTML STYLE GUIDES AND STANDARDS

Composing good HTML (Version 2.0)
URL: http://www.cs.cmu.edu/afs/cs.cmu.edu/Web/People/tilt/cgh

While the focus of this document is on writing HTML, the author provides a large section on design considerations at the bottom of the document. This is a large document.

Putting Information onto the Web, a collection of documents on authoring hypertext
URL: http://www.w3.org/hypertext/WWW/Provider/Overview.html#author

NSF/NCSA World Wide Web Federal Consortium Training Materials Page
URL: http://skydive.ncsa.uiuc.edu/where/training/html

Style Guide for Online Hypertext
URL: http://www.w3.org/hypertext/WWW/Provider/Style/Overview.html

NSCA HTML Style Sheet, National Center for Supercomputing Applications

URL: http://www.ncsa.uiuc.edu/Pubs/StyleSheet/NCSAStyleSheet.html

Guide to Writing HTML Documents, National Center for Supercomputing Applications
URL: http://union.ncsa.uiuc.edu/HyperNews/get/www/html/guides.html

Composing Good HTML
URL: http://www.cs.cmu.edu/~tilt/cgh

Introduction to HTML and URLs, Ian Graham, University of Toronto
URL: http://www.utirc.utoronto.ca/HTMLdocs/NewHTML/intro.html

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WORLD WIDE WEB STATISTICS

Piper Resources: The Piper Letter
URL: http://www.piperinfo.com/piper/pl01/usage.html

This is a paper from piper resources that is outstanding on issues/discussion related to keeping and maintaining web statistics.

World-Wide Web Access Statistics for istweb/syr.edu
URL: http://istweb.syr.edu/stats.html

This is a good example of the low end, state-of the-art freeware approach.

WORLD WIDE WEB SECURITY

The World Wide Web Security FAQ, Lincoln D. Stein, Whitehead Institute for Biomedical Research
URL: http://www-genome.wi.mit.edu/WWW/faqs/www-security-faq.html

Common Gateway Interface (CGI) Security, Paul Phillips
URL: http://www.primus.com/staff/paulp/cgi-security/

ACCESSIBILITY TO USERS WITH DISABILITIES

Design of HTML Pages to Increase Their Accessibility to Users with Disabilities, Trace R&D Center, University of Wisconsin, Madison
URL: http://www.trace.wisc.edu/HTMLgide/

Writing Accessible HTML Documents, Paul Fontaine, GSA Center for Information Technology Accommodation
URL: http://www.gsa.gov/coca/WWWcode.htm

MISCELLANEOUS

Web Site Script Evaluation Methodology

URL: http://research.umbc.edu/~bertot/web.methodology.draft1.html

Federal Website Locator

URL: http://www.law.vill.edu/Fed-Agency/fedwebloc.html

This is an index of Government Agency Websites.

Return to Top

Updated 2/3/97

Send Comments to Kevin Bontenbal
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5. B. **PROJECT ABSTRACT** <http://istweb.syr.edu/Project/Faculty/abstract.html>

SYRACUSE UNIVERSITY SCHOOL OF INFORMATION STUDIES

Quality Criteria For Evaluating Information Resources And Services Available From Federal Websites Based On User Feedback

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Project Abstract

In June of 1996, the Online Computer Library Center (OCLC), Office of Research, awarded a Library and Information Science Research Grant to the School of Information Studies at Syracuse University to explore the degree to which federal agencies' World Wide Web (WWW) sites (web pages) meet the needs of their constituencies. The grant is scheduled to conclude in May, 1997.

Significance of the Study

Federal agencies are constructing web pages in recognition of the effectiveness of the WWW for the dissemination of information. Lacking are quality criteria to ensure that the information is effectively presented and communicated. A window of opportunity presently exists through which fundamental issues of infrastructure, organization, management, and optimization of federal information resources in the WWW medium may be addressed. This evaluative effort expects to propose quality benchmarks during an early diffusion phase of an innovative emerging technology.

This research intends to help bring attention to a unique opportunity for implementing carefully developed standards into this valuable communications medium. It is a premise of this research effort that federal web pages are potentially rich information resources. In fact, they are becoming a key means to an array of federal information. Careful consideration of the purpose, structures, and maintenance of these resources now can set guidelines which will help to minimize the expense and frustration of post hoc efforts at a later date.

Goals and Objectives

The overall goal of the study is to assess the quality of selected federal websites based on feedback provided by actual users. This assessment has the following objectives:

- Establish evaluative criteria for reviewing web pages
- Evaluate a sample of federal web pages
- Identify and define salient issues regarding representation and access to information resources through web pages
- Identify trends and issues which may impact the design and management of webpages
- Identify and analyze key information policy issues related to the design, development, and management of Web-based information resources and services
- Offer recommendations to increase the usefulness of federal websites to libraries and other users.

Accomplishment of these goals and objectives should provide a baseline for improving the manner in which these websites are designed and operated.

Methodology

The exploratory analysis employs a combination of qualitative and quantitative techniques, providing both a content analytic scheme and descriptive measures for reviewing federal websites. Prior to evaluating each webpage, criteria will be established to evaluate the webpages according to two main categories: (1) system-based -- assessing actual webpage configurations, and (2) content-based -- assessing the value of the webpage organization, and relevance to agency mission. A technical review of the webpage will supplement user feedback derived from popup questionnaires. A third method of assessment will be the use of scripts by proxies at Syracuse University. Part of the research will involve interviews with federal employees and contract staff who either have been and/or are still involved in webpage development. A series of focus groups will allow various study participants to share experiences and views of critical success factors regarding the past and future of federal webpages.

Project Products

A Final Report summarizing project activities and offering recommendations for Federal website quality guidance will be issued at the conclusion of the project.

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